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No. 181. PLANTAGINACEAE

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Conspectus of Families of Vascular Plants represented in the Flora of New South Wales

(The account of each family, or consecutive group of families as issued, will appear with separate pagination; the names of those families that have been published to date are in italics.)

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FLORA OF NEW SOUTH WALES

Produced under the Direction of
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Royal Botanic Gardens
Sydney

No. 181. PLANTAGINACEAE

By
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and J. M. PULLEY

EDITOR: MARY D. TINDALE

Formerly produced under the direction of K. Mair, 1964-1970

181. PLANTAGINACEAE

By B. G. Briggs, R. C. Carolin* and J. M. Pulley†‡

Flowers small, arranged in terminal spikes or heads (or rarely solitary), usually on axillary scapes, bisexual or unisexual, bracteate but without bracteoles. *Sepals* 4, free or sometimes the lower pair ± united, imbricate, equal or unequal. *Corolla* sympetalous; the lobes 3 or 4, imbricate. *Stamens* (1–2–) 4, hypogynous, epipetalous or free. *Ovary* superior, 2-carpellary (or possibly sometimes 1-carpellary) 1–2-locular or up to 4-locular by the growth of false septa, placentation axile or basal or free-central, ovules semi-anatropous. *Style* simple, terminal. *Fruit* a circumscissile capsule or a hard nut. *Seeds* peltate with a usually straight embryo embedded in the endosperm.

Herbs, sometimes suffruticose. *Leaves* all basal and arranged in a rosette or more rarely opposite or alternate on the stems, simple, entire or pinnatifid, sessile or narrowed towards the base into a more or less distinct petiole; the base broadened and usually with a tuft of axillary hairs which may or may not be prominent.

A family of three genera of which the great majority of species are included in the large cosmopolitan genus *Plantago*. The remaining two genera, which have single-seeded nuts, comprise only about 4 species and are absent from the Australasian region.

PLANTAGO L.

Plantago: Latin name applied to several species of the genus; possibly derived from *planta*, the sole of the foot, and the suffix *-ago*, "having the characteristics of".

Flowers bisexual, in axils of bracts which usually closely resemble the sepals. *Sepals* persistent. *Corolla* scarious to membranous with a narrow tube, persisting at the top of the capsule although rupturing at the base; lobes 4, spreading or erect (in cleistogamous flowers). *Stamens* 4, alternating with the corolla lobes and adnate to the corolla-tube, usually exserted but sometimes enclosed within the erect corolla lobes in cleistogamous flowers; filaments filiform; anthers 2-locular, apiculate, usually versatile. *Ovary* of 2 carpels, usually bilocular but sometimes 4-locular by placental outgrowths and at other times with a small false loculus at the apex of one of the loculi; placentation axile; ovules 1–6 (–8) in each loculus. *Style* filiform with 2 longitudinal rows of stigmatic hairs. *Fruit* a capsule enclosed in the persistent calyx, circumscissile with the upper portion ± hardened and deciduous and the lower portion membranous and persistent. *Seeds* with the hilum superficial or contained in a fold or groove and with a variously mucilaginous testa.

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Annual or perennial herbs or suffruticose, with branched more or less woody stems or a condensed simple or branched caulorrhiza (rootstock). *Root-system* primary or adventitious. *Leaves* all basal, crowded and usually spirally arranged on the caulorrhiza, or rarely cauline and either opposite or spirally arranged.

A genus of about 260 species, cosmopolitan but most common in temperate regions; in the tropics mostly at high altitudes. In New South Wales 15 species are native (of which one is endemic to Lord Howe Island) and 5 are naturalized. About 24 species are native to Australia, including 5 endemic in Tasmania and one common to Tasmania and the Auckland Islands (S. of New Zealand), while at least 8 are naturalized.

The following species are recorded as naturalized in other Australian States but not in New South Wales:—*P. bellardii* Allioni (a small annual with long bracts to the lower flowers of the spike) is native to the Mediterranean region and relatively common in parts of western Victoria and South Australia, *P. albicans L.* (also from the Mediterranean) has been collected in South Australia, and the South American *P. australis* Lamk. has become locally common in some locations in Victoria and Tasmania. However, *P. cretica* L., *P. lagopus* L. and *P. aristata* Michx. are represented in Victoria only by early collections or reports [see Willis, Handb. Pl. Victoria 2: 607 (1972)], and may no longer persist. Similarly, the occurrence of *P. afra* L. (*P. psyllium* auct.) in South Australia has not been confirmed by recent collections.

Pilger in Engler, Pflanzenr. 269, Heft 102: 1–432 (1937) recognized 2 subgenera and 19 series, but considerable revision of these is necessary. The species occurring in New South Wales are placed in Pilger's groupings in the list below. Names used by Pilger are followed (in parenthesis) by the legitimate names, where he did not use the latter. Naturalized species are marked by asterisks.

Subgenus *Euplantago* (*Plantago*)

Section 1. *Polyneuron* (*Plantago*): **major*
3. *Palaeopsyllium*: *hedleyi*
5. *Oliganthos*: *glacialis, muelleri, palustris, alpestris, euryphylla*
7. *Coronopus*: **coronopus*
9. *Novorbis* (*Virginica*): **myosuros*
10. *Mesembrynia*: *cladarophylla, debilis, hispida, antarctica, varia, gaudichaudii, turrifera, cunninghamii, drummondii*
16. *Arnoglossum*: **lanceolata*

Subgenus *Psyllium*

Section 19. *Psyllium*: **indica*

Briggs in Contr. New South Wales Natl. Herb. 4: 399–405 (1973) reported on chromosome numbers and karyotypes in most of these species. Vouchers for chromosome numbers are given by Briggs except where non-Australian material is indicated or where vouchers are specified in the citation lists of specimens.

Lectotypes for names of several Australian species were designated by Briggs, Carolin & Pulley in Contrib. New South Wales Natl. Herb. 4: 395-398.

The introduced species include several widespread, weedy species, common as colonists of disturbed sites. *P. debilis*, *P. turrifera*, *P. cunninghamii* and *P. drummondii* may also colonize such sites within their distributions. Most of the perennial species, however, occur largely in relatively undisturbed habitats but occasionally persist in situations where introduced grass species have mostly replaced native perennial grasses.

All species show great variability in plant size and in the number of flowers in the spike, depending on the prevailing conditions, but this is particularly evident in the naturalized and the annual species. The flowers are generally protogynous and wind-pollinated. However, insect pollination has been reported in *P. lanceolata* by H. T. Clifford in Nature 193: 196 (1962), and some species, such as *P. myosuros*, include cleistogamous forms.

Some species are of minor value as fodder plants, particularly in the semi-arid inland, but the naturalized species are now usually regarded as undesirable constituents of pasture. In the eastern Mediterranean region and in India *Plantago* seeds have been used medicinally and as a commercial source of mucilage. Watt, J. M., & Breyer-Brandwijk, B. B., Medicinal and Poisonous Plants of Southern and Eastern Africa, ed. 2, 848–849 (1962), list a variety of uses in folk medicine.

Descriptive terminology: Capsule length includes any hollow apical beak-like prolongation of the body of the capsule but does not include the thickened and usually persistent stylar base.

The term ‘carina’ is used for the thickened strip along the midvein of bracts or sepals. It may be narrow or may extend considerably more than half the width of the structure. In some species it is sharply keeled whilst in others it is thickened but rounded or somewhat flattened.

1. Plants with elongated, branching, leafy stems. Leaves opposite and linear. Lower bracts with leaf-like tips . . . . *P. indica* 1.

1.* Rosette plants with all leaves radical. Bracts not leaf-like.

2. Leaves deeply pinnately or bipinnately lobed or rarely entire and linear, pilose with stiff spreading hairs. Lower half of the corolla tube hairy on the outside . . . . *P. coronopus* 2.

2.* Leaves entire or dentate, glabrous or pilose. Corolla tube glabrous.

3. Capsules with 8–16 seeds. Leaf laminae ovate or broad-elliptic, thin-textured, abruptly narrowed into a petiole ± as long as the lamina . . . . *P. major* 3.

3.* Capsule with 2–5 seeds. Leaf laminae narrower or with shorter petioles.

4. Corolla lobes erect and rigid after anthesis. Ovules 3; usually 3 seeds developing . . . . *P. myosuros* 4.

4.* Corolla lobes spreading after anthesis, not rigid. Ovules 4–5; 1–5 seeds developing.

5. Scapes with regular longitudinal ridges. Spikes compact. Bracts ovate-acuminate. Anterior sepals fused; the fused structure bilobed with 2 brown nerves *P. lanceolata* 5.

5.* Scapes not conspicuously ridged. Spikes compact or lax. Bracts not acuminate. Sepals all free.

6. Taproot not developed. Perennials with adventitious roots from a short rootstock or a ± rhizomatous stem. Bracts glabrous except for the sometimes ciliate margin. Alpine, subalpine or upper montane plants or from Lord Howe Island.

7. Spikes with 1–8 (–12) flowers. Rosettes small and numerous forming a close turf, *or* larger plants with the scapes very short at flowering stage (so that the flowers are situated among the leaf bases) but elongating after flowering.

8. Leaves to 5 mm broad. Spikes with (1–) 2–3 flowers. Rosettes small, forming a turf . . . . *P. glacialis* 7.

8.* Leaves more than 5 mm broad. Spikes mostly with more than 3 flowers. Not forming a turf.

  9. Leaves glossy, usually spreading. Upper bracts broad-elliptic and thickened ..... *P. muelleri* 8.

  9.* Leaves dull, usually ± erect. Upper bracts narrow-elliptic, thickened only on the midrib .... *P. palustris* 9.

7.* Spikes mostly with more than 10 flowers. Flowers held above the leaf bases at flowering stage. Not forming a turf.

  10. Leaves glabrous, length (including petiole) mostly c. 4 times the breadth. Sepals narrow-elliptic. Stem sometimes elongated and rhizomatous. Lord Howe Island .... *P. hedleyi* 6.

  10.* Leaves sparsely or densely pilose. Leaves and sepals broader. Rootstock short. Mainland species.

    11. Leaves thin-textured, length (including petiole) more than 3 times the breadth. Barrington and Gloucester Tops .... *P. cladarophylla* 12.

    11.* Leaves ± fleshy or leathery, length less than 3 times the breadth. Southern Tablelands.

      12. Leaves 3 (–5)-nerved, lateral nerves much less conspicuous on upper surface than midvein and not extending into distal half of lamina, ± fleshy with a satiny gloss when fresh (thin and dull when dry). Fruiting spikes 0.8–4 (–6) cm long .... *P. alpestris* 10.

      12.* Leaves (3–) 5 (–9)-nerved, nerves mostly all conspicuous on upper surface and all extending into distal half of lamina, leathery and ± glossy when fresh (dull when dry). Fruiting spikes (2–) 4–8 (–12) cm long .. *P. euryphylla* 11.

6.* Taproot developed. Perennial or annual. Bracts pilose or glabrous. Widely distributed but excluding alpine habitats and Lord Howe Island.

  13. Annuals of the Western and Far Western Plains and Western Slopes, very rarely introduced on the Coast and Tablelands. Capsule large (3.4–5.0 mm long) *or* with a truncate beak *or* distinctly contracted below the apex.

    14. Capsule with an almost cylindrical beak, the apex truncate and minutely

lobed. Sepals green or straw-coloured .... *P. turrifera* 18.

14.* Capsules acute, without a cylindrical beak.

15. Capsules large, 2.2–3.2 mm diam., not distinctly contracted below the apex. Bracts and sepals usually dark brown or blackish .... *P. drummondii* 20.

15.* Capsules smaller, 1.7–2.0 (–2.4) mm diam., distinctly contracted below the apex. Bracts and sepals dark brown or pale ...... *P. cunninghamii* 19.

13.* Perennials or rarely annuals of the Coast, Tablelands, Slopes and rare on the Plains. Capsules not as above.

16. Sepal with a glabrous carina.

17. Sepals 1.5–2.0 (–2.4) mm long. Leaves thin in texture.

18. Leaves linear-elliptic to lanceolate or elliptic. Sepal with a rounded or flattened carina. Capsules 2.5–3.8 mm long. Barrington and Gloucester Tops .... *P. cladarophylla* 12. (bis)

18.* Leaves oblanceolate to obovate. Sepal usually distinctly angled at the midvein. Capsules 1.7–3.0 mm long. Widely distributed ... *P. debilis* 13.

17.* Sepals (2.0–) 2.1–2.5 (–2.9) mm long. Leaves usually thick-textured (except in very moist sites) ...... *P. antarctica* 14.

16.* Sepal with a pilose carina.

19. Sepals 2.8–3.5 (–4.0) mm long. Leaf axils with tufts of long (2–6 mm) red-brown or deep golden-brown hairs.

20. Leaves narrow-elliptic, length 5–10 times the breadth, pilose with soft short hairs to 1 mm long .. *P. varia* 16.

20.* Leaves linear or very narrow-elliptic, length more than 15 times the breadth, *either* glabrous *or* pilose with long or short hairs . *P. gaudichaudii* 17.

19.* Sepals 1.5–2.8 (–3.0) mm long. Leaf-axils with short whitish or yellowish-brown hairs.

21. Sepals 1.5–2.2 (–3.0) mm long. Leaves

mostly oblanceolate to obovate, rarely narrower, 8–40 mm broad. Spikes usually lax at maturity . . . . *P. debilis* 13.

21.* Sepals 2.2–2.8 (–3.0) mm long. Leaves mostly narrow-oblong to oblanceolate, 3–12 mm broad. Spikes usually compact at maturity . . . . *P. hispida* 15.

1. *Plantago indica L., Syst. Nat. ed. 10, 2: 896 (1759); Pilger in Engler, Pflanzenr. 269, Heft 102: 418 (1937); Beadle, Evans & Carolin, Fl. Sydney Reg. 432 (1972).

P. arenaria Waldst. et Kit., Descr. et Icon. Pl. Rar. Hungariae 1: 51 (1801). Further synonymy is given by Pilger in Engler, Pflanzenr. 269, Heft 102: 418 (1937).

Annual herb, 20–30 (–60) cm tall. *Stems* elongated, usually erect, branched, leafy, pubescent with many of the hairs distinctly glandular-tipped. *Leaves* cauline, opposite, linear, 2.5–6 cm long, c. 1 mm wide, pubescent on both surfaces and usually with some minute teeth on the margin, acute, sessile, the axils villous but the broadened leaf-base completely obscuring the minute tuft of white hairs. *Peduncles* in the axils of the upper leaves, glandular-pubescent, to 8 cm long. *Spikes* dense, globular to ovoid, to 2 cm long. *Bracts* obovate-spathulate to elliptic; lower bracts with a narrow membranous margin and the apex prolonged into a linear leaf-like appendage to 1 cm long; upper bracts 3–5 mm long and 2–4 mm wide, obtuse, with a ± thickened, rounded, somewhat pubescent carina ⅔–¾ of the total width, and with a membranous margin. *Sepals* unequal, pubescent on the slightly thickened carina and membranous towards the ciliate margin; anterior sepals elliptic, 4–5 mm long, 1.5–2 mm wide; posterior sepals ovate-elliptic to oblong, 3–3.5 mm long, 1–1.5 mm wide with the carina often very narrow. *Corolla*: tube c. 3.5 mm long; lobes ovate-elliptic, 1.8–2 mm long, c. 1 mm wide, acute to acuminate with a distinct midvein. *Stamens* with filaments to 1.8 mm long; anthers c. 1.5 mm long and 1 mm wide. *Style* to 3 mm long. *Ovary* bilocular with one ovule in each loculus. *Capsule* ovoid c. 2 mm diam., both the upper and the lower portions ± membranous-scarious. *Seeds* brown or black, elliptic, 2 mm long, 1 mm wide, concavo-convex, with a thick mucilaginous layer, the hilum sunken in a broad and deep concavity. *Chromosome number*: $2n = 12$ (various reports on non-Australian material and as reported below). Fl. Nov.-Feb. "Sand Plantain"

DISTRIBUTION: Naturalized in a limited area of New South Wales toward the east of the North Western Slopes and perhaps the adjacent edge of the Northern Tablelands; in pasture on sandy soils. Recorded once from sand dunes near Sydney (Beadle, Evans & Carolin, loc. cit.). Also naturalized in Victoria and South Australia. Native to south and central Europe as well as southwestern Asia and now established in many other regions.

NORTHERN TABLELANDS: Booroolong Creek, W. of Armidale, *Williams* 3.1970 (UNE); W. of Uralla. *Walker NSW 121605*, 2.1955. NORTH WESTERN SLOPES: Bundarra, *Moodie NSW 85320*, 12.1939, *Readett NSW 85321*, 1.1967; "Abergeldie", Barraba. *Spencer NSW 136878*, 2.1976 (chromosome count voucher, $2n = 12$); "Pine Villa", Moonbi, *Mallise NSW 121606*, 2.1961, *McCormack NSW 120822*, 12.1970, *Williams NSW 136259*, 11.1973; Kootingal, - *NSW 121607*, 2.1938; Tamworth district?, *Chaffey NSW 121608*, 12.1930; Tamworth district, *Loveridge NSW 121609*, 11.1954.

The elongated, leafy stems distinguish this species from all others native or naturalized in New South Wales.

The closely allied species *P. afra* L., which lacks herbaceous elongated tips on the lower bracts, has apparently become established at a few localities in South Australia but is less common there than is *P. indica*. Moreover the occurrence of *P. afra* has not been confirmed by recent collections. Verdcourt in Fl. Trop. East Africa, Plantaginaceae: 6 (1971) points out that *P. afra* L. is the correct name for the species which has been very generally known as *P. psyllium* L. The references to *P. psyllium* by Black, Fl. South Australia ed. 2: 793 (1957) and to *P. indica* by Eichler, Suppl. Black's Fl. South Australia: 287 (1965) do not distinguish between these two species. Another species of Section *Psyllium*, *P. sempervirens* Crantz, has been cultivated at the Dickson Experiment Farm, Canberra, A.C.T. (*W. Hartley* 12.1952 CANB) and there is one record of an adventive occurrence: CSIRO grounds, Black Mtn, Canberra, "only one plant seen" *Gray 4622*, 16.11.1959 (CANB). This species has been widely known as *P. cynops* L. (see Verdcourt, loc. cit.) and is a perennial with ± subglabrous stems and leaves, the lower bracts of the spikes very broad and with acuminate tips.

2. ***Plantago coronopus** *L.*, Sp. Pl. 1: 115 (1753); Decaisne in Candolle, Prodr. 13 (1): 732 (1852); J.D. Hooker, Fl. Tasmaniae 1: 305 (1857); Bentham, Fl. Austral. 5: 138 (1870); Hegi, Illustr. Fl. Mittel-Europa 6: 188 (1914); Gardner, Enum. Pl. Austral. Occ.: 121 (1930); Ewart, Fl. Victoria: 1037 (1931); Pilger in Engler, Pflanzenr. 269, Heft 102: 126 (1937); Black, Fl. South Australia ed. 2, 4: 793 (1957); Leigh & Mulham, Pastoral Pl. Riverine Plain: 108 (1965); Patzak & Rechinger, Plantaginaceae, in Rechinger, Flora Iran, 15/28, 6: 5 (1965); Runemark in Bot. Not. 120: 9–16 (1967); Curtis, Stud. Fl. Tasmania 3: 560 (1967); Burbidge & Gray, Fl. Austral. Cap. Territory: 334 (1970); Beadle, Evans & Carolin, Fl. Sydney Reg.: 433 (1972); Willis, Handb. Pl. Victoria 2: 606 (1973).

SYNONYMY: see Pilger in Engler, Pflanzenr. 269, Heft 102: 126 (1937).

Perennial or sometimes annual, with a persistent taproot and a sometimes branched caulorrhiza. *Leaves* all basal and arranged in a rosette, spreading or ascending, oblong to narrow-oblong or rarely linear in outline, (0.5–) 1–7 (–40) cm long, (0.2–) 0.5–2 (–5) cm in overall width, rarely entire but usually pinnatisect or with prominent linear teeth, the lobes often further cut, acute, pubescent to almost glabrous, thick, with a single ± prominent vein, tapering very gradually towards the scarious base, the axil villous with a tuft of white hairs. *Scapes* to 45 cm tall but often much shorter, erect or ascending, slender or rather stout, pubescent with antrorse-appressed hairs. *Spikes* compact, cylindrical, rarely subglobular, (0.2–) 0.8–5 (–15) cm long, rarely purplish. *Bracts* very broad-ovate, 1.5–2.8 mm long, 1.3–2.5 mm wide, concave, glabrous, membranous towards the margin but with an obtusely keeled thickened carina c. ½ of the total width, acuminate with an inconspicuous axillary tuft of hairs. *Sepals* unequal: 2 outer sepals elliptic, 2.3–2.5 mm long, 1–1.5 mm wide, pubescent, obtuse, membranous towards the margin but with a broad central carina, ciliate-laciniate on the margin not covered by the bract; 2 inner sepals concave-plicate, ovate, 2.5–3 mm long, pubescent with a narrower carina than the outer sepals and winged on the angle of the keel, membranous towards the margin and ciliate on the exposed margin. *Corolla*: tube 1–1.5 mm long, pubescent; lobes ovate-elliptic, 0.8–1 mm long, 0.5–0.7 mm wide, obtuse or acute with a prominent midvein. *Stamens* with filaments to 2.5 mm long; anthers subglobular, occasionally pinkish. *Style* 2.5–2.8 mm long. *Ovary* bilocular with placental outgrowths further dividing the ovary into 4 and with an outgrowth of the placenta near the apex producing a fifth terminal false-loculus. *Capsule* ovoid, 2–2.5 mm long, 1–1.5 mm diam. with the stylar base persistent as a small mucro, the membranous lower portion

c. 0.5 mm long, the upper portion hardened. *Seeds* 5 or fewer by abortion, one seed in each false loculus including the apical false loculus: lower seeds greyish-brown with a thin mucilaginous layer, the hilum forming a small pit; apical seed retained in the upper portion of the capsule, globular, 0.4 mm diam., brown, with a thinner mucilaginous layer. *Chromosome number* 2n = 10, 20, 30, also various aneuploid derivatives (2*n* = 10 in Australian material of ssp. *coronopus* studied). Fl. throughout the year but mostly Sept.-Dec. "Buck's-horn Plantain".

DISTRIBUTION: Widely naturalized on roadsides and other disturbed sites and in maritime situations. See under the subspecies.

Distinguished from all other species occurring in the State by the compressed flowers, pubescent corolla tube and apparently 4-locular ovary. The shape of the leaves is very variable but the most common condition, with deeply pinnate or bipinnate lobing, is also distinctive.

Three subspecies are recognized (Runemark, loc. cit.), of which two are naturalized in New South Wales and the third, ssp. *cupanii* (Guss.) Pilger, is native to Sicily and North Africa.

1. Scapes slender, 0.5–1.8 mm diam., mostly longer than the leaves; bracts mostly exceeding sepals; carina of anterior sepals ± equal to or slightly broader than the membranous margins .... ssp. *coronopus* a.

1.* Scapes stout (0.3–) 1.3–2.3 mm diam., shorter than or equalling the leaves; bracts mostly shorter than or equal to sepals, carina of anterior sepals much broader than the membranous margins .... ssp. *commutata* b.

a. *P. coronopus ssp. **coronopus**

Distinguishing characters are set out in the key and as follows:—*Spikes* dense but flowers often slightly spreading. *Bracts* mostly tapering to an elongated slender tip. *Chromosome number*: mostly 2*n* = 10 (Australian and non-Australian records).

DISTRIBUTION: Naturalized on the Central and South Coast, the extreme north of the Northern Tablelands and the lower parts of the Southern Tablelands. Also naturalized in Queensland, Victoria, Tasmania, South Australia and Western Australia. Native to Europe and western Asia and now widely established.

CENTRAL COAST: Sailors Bay, Middle Harbour, *Hamilton NSW 132530*, 9.1909; SE. shore of Iron Cove, Leichhardt, *Rodd 2738*, 11.1975; Saleyards, Flemington, *McBarron 17950*, 9.1969; Bondi to Tamarama, *Johnson NSW 132532*, 1.1950; Bronte Beach, c. 8 km SE. of Sydney, *Coveny 4205*, 5.1972; Coogee, *Hamilton NSW 132533*, 10.1900, *Cheel NSW 132534*, 11.1909, *Coveny & Shanker 7258*, 10.1975; La Perouse, c. 10 miles [16 km] S. of Sydney, *Coveny 730*, 1.1969, *Coveny 6437 & Powell* 6.1975; Scarborough Park, Kogarah, c. 7 miles [c. 11 km] SSW. of Sydney, *Constable NSW 70314*, 11.1963; Carss Park, Blakehurst, *Jacobs 2356, 2357, 2358*, 11.1975; Dolls Point, 8 miles [13 km] S. of Sydney, *Constable 7149*, 9.1966. SOUTH COAST: Nowra, *Rodway NSW 89657*, 11.1952; Royal Australian Naval College, Jervis Bay, *Rodway NSW 121622*, 12.1946, *NSW 89658*, 1.1955; cliffs above Blue Pool, Bermagui, *Carolin B130*, 3.1957 (SYD). NORTHERN TABLELANDS: Jennings, *Williams* 12.1966 (UNE). SOUTHERN TABLELANDS: Goulburn, *Green NSW 121623*, 4.1959; Tarago-Bungendore road *Briggs & Rodd 616*, 4.1968; 13 km E. of Bungendore on road to Doughboy, *Briggs 4363a*, 10.1971.

b. *P. coronopus ssp. **commutata** *(Guss.) Pilger* in Feddes Repert. Spec. Nov. Regni Veg. 28: 287 (1930); Pilger in Engler, Pflanzenr. 269, Heft 102: 126 (1937).—*P. commutata* Guss, Fl. Sic. Prodr. Suppl. 1: 46 (1832).

Distinguishing features are set out in the key and as follows:—*Spikes* very dense with flowers appressed to the axis and closely imbricate. *Bracts* acute or obtuse. *Chromosome number*: 2*n* = 20 (non-Australian records).

DISTRIBUTION: Naturalized in scattered locations in the southern half of New South

Wales from the Coast to the eastern edge of the Western Plains; absent from the higher and moister parts of the Tablelands. Also naturalized in Victoria, Tasmania, South Australia and Western Australia. Native to the southern and eastern Mediterranean region.

Central Coast: Rose Bay district, *Boorman NSW 132531*, 10.1899; Cooks River, *Hamilton NSW 132535*, 10.1909; Kogarah, *Camfield NSW 132536*, 10.1899; Carlton, *Camfield NSW 132537*, 6.1897. South Coast: Greenwell Point, *Rodway NSW 121621*, 10.1942; Eden Wharf, Twofold Bay, *Davis NSW 89652*, 12.1952. Southern Tablelands: Queanbeyan, *McKee 11780*, 11.1964. Central Western Slopes: Temora, *Dwyer NSW 121624*, 10.1915. South Western Slopes: Lockhart to Urana road, *Constable 5189*, 10.1964; Wallandool near Urangeline, *McBarron 5116*, 10.1950; Ryan (near Henty), *McBarron 5086*, 10.1950 (NSW, SYD); Bells road, Gerogery, *McBarron 5075*, 10.1950 (NSW, SYD); Henty Cemetery Reserve, *Tindale NSW 21401*, 10.1952. Western Plains: Urana, *Inspector of Stock NSW 830*, 9.1945; Deniliquin, *Inspector of Stock NSW 121625*, 9.1911.

3. *Plantago major *L.*, Sp. Pl. 1: 112 (1753); F.M. Bailey, Queensland Fl. 4: 1210 (1901); F.M. Bailey, Compr. Cat. Queensland Pl.: 396 (1912); Hegi, Illustr. Fl. Mittel-Europa, 6: 181 (1914); Gardner, Enum. Pl. Austral. Occ.: 121 (1930); Pilger in Engler, Pflanzenr. 269, Heft 102: 41 (1937); Black, Fl. South Australia ed. 2, 4: 793 (1957); Sagar & Harper in Biol. Flora British Isles, J. Ecol. 52: 189-221 (1964); Curtis, Stud. Fl. Tasmania 3: 559 (1967); Beadle, Evans & Carolin, Fl. Sydney Reg.: 433 (1972); Willis, Handb. Fl. Victoria 2: 604 (1973).

Synonymy: See Pilger in Engler, Pflanzenr. 269, 102: 41 (1937).

Short-lived perennial with a thick caulorrhiza and a mostly adventitious root system at maturity. *Leaves* all basal and arranged in a rosette, spreading to ascending, elliptic-obovate, tapering into an indistinct petiole 2–12 (–26) cm long which broadens into a thin-textured base almost obscuring the axillary tuft of pale-brown hairs: lamina ovate-elliptic, 4–20 (–25) cm long, 2.5–10 (–15) cm wide, sparsely pubescent or almost glabrous on both surfaces but usually with at least some scattered hairs on the veins, 5–7-veined; the margins irregular with some obscure, distant, blunt teeth. *Scapes* to 40 cm tall, sparsely pubescent to almost glabrous. *Spikes* cylindrical, (4–) 8–25 (–38) cm long, condensed except in the lower portion at the fruiting stage. *Bracts* elliptic, 2.5–3 mm long, 1–2 mm wide, usually glabrous or nearly so with a carina c. ½ of the total width and keeled distally. *Sepals* subequal, broad-ovate to orbicular, 2–2.5 mm long, 2–2.4 mm wide, with a distinct keel, the carina c. ½ the total width, glabrous or nearly so, obtuse. *Corolla*: tube 2–2.5 mm long; lobes ovate, 1.5–1.8 mm long, 0.8 mm wide, acute with a distinct midvein. *Stamens* with filaments 3–4 mm long; anthers 0.8–1 mm long, 0.8 mm wide. *Style* 4–5 mm long. *Ovary* bilocular with 3–8 ovules in each loculus. *Capsule* subglobular to ovoid, 5–6 mm long, 4–5 mm diam., the stylar base persistent as a short mucro, upper cartilaginous and lower membranous portions almost equal. *Seeds* to 16 in number, dark brown, irregular and angular, to 2 mm long, with a superficial hilum and a thin mucilaginous layer. *Chromosome number*: 2n = 12. Fl. Oct.-Mar. "Large Plantain".

Distribution: Naturalized on the Coast, Tablelands and towards the eastern edge of the South Western Slopes of New South Wales and on Lord Howe Island. Moist places, often on creek banks and soakages or in disturbed sites. Also naturalized in Queensland, Victoria, Tasmania, South Australia and Western Australia. Native of Europe as well as northern and central Asia but now established almost world-wide except for the lowland tropics.

North Coast: Tweed River, 6 miles [c. 10 km] SW. of Murwillumbah, *Constable 6578A*, 11.1965; Mummulgum, Casino district, *Young NSW 121588*, 10.1948; behind Angourie beach, near Yamba, *Bryant 042*, 12.1975; Thora to Dorrigo, *Salasoo 1927*, 1.1960; 0.5 km S. of Smoky Cape Lighthouse, *Johnson 7845*, 1.1975; Flynns Beach, Port Macquarie, *Wallace*

11.1974 (UNE); Bulahdelah State Forest, *Salasoo 2699, 2899,* 1.1964. CENTRAL COAST: Windsor, *Boorman NSW 121589,* 1.1919; Hornsby, near the Fish Ponds, *Briggs NSW 121590,* 1.1961; Collaroy, *Mair* 3.1931 (SYD); Wollstonecraft, *Briggs 4481,* 3.1972; Clifton Gardens, *Cheel NSW 121591, 6.* 1911; Governors Domain, *Camfield NSW 121592,* 11.1902; Governors Paddock [The Domain, Sydney], *Camfield NSW 121593,* 12.1902; Botanic Gardens [Sydney], *Betche NSW 121594,* 11.1892; Woolloomooloo Bay, *Collie NSW 121596,* 10.1892; Paddington, *Bryant 045,* 2.1976; [Sydney] University, *Evans* 2.1931 (SYD); Bronte Beach, *Coveny 4206,* 5.1972; Coogee, *Coveny 7261 & Shanker* 10.1975; Lidcombe, *Salasoo 1538,* 12.1957; Arncliffe, *Hamilton NSW 121597,* 4.1913; Scarborough Park, Kogarah, c. 7 miles [c. 11 km] SSW of Sydney, *Constable NSW 70315,* 11.1963; N. of Cronulla Beach, *Crawford* 3.1963 (SYD); Picton, *Johnson NSW 121598,* 11.1949; Austinmer, *Davis NSW 121599,* 2.1941; Bulli Pass, *Burgess CBG 009293,* 1.1964 (CBG); Wollongong, *McBarron 4150,* 11.1949 (SYD). SOUTH COAST: Nowra, *Rodway NSW 121600,* 5.1921, *NSW 89660,* 1.1952; Milton, *Cambage 3485,* 12.1911 (NSW, SYD), *Breakwell NSW 121601,* 12.1913; Tuross River, Bodalla, *Constable 4144,* 1.1963; Tathra, *Johnson NSW 121602,* 11.1950. NORTHERN TABLELANDS: Ebor Falls, *Williams* 12.1972 (UNE, NSW). CENTRAL TABLELANDS: Blayney, *Griffith NSW 121603,* 12.1917. SOUTHERN TABLELANDS: Brown Mountain, E. of Nimmitabel, *Gray 5672,* 1.1965 (CANB, NSW). SOUTH WESTERN SLOPES: Tumut, *Shire Clerk NSW 121604,* 1.1937. LORD HOWE ISLAND: Lagoon Road between Flagstaff and Government House, *Rodd 1214 & Johnson* 9.1970; Blinky Beach, *Douglas NSW 63361,* 6.1965; Rocky Run, *Rodd 1310 & Johnson* 9.1970; N. end of Little Slope, *Pickard 2740,* 12.1975; Lord Howe Island, *Boorman NSW 121611,* 5.1920, *Maiden NSW 121612,* 4.1898.

Distinguished from other species in New South Wales by the numerous seeds in the capsule and the relatively distinct petiole.

4. *Plantago myosuros *Lamk.,* Ill. Gen.: 342 (1791); Rahn in Dansk Bot. Ark. 30: 115–121 (1974).

SYNONYMY: see Rahn (loc. cit.).

Annual with a short caulorrhiza and a persistent taproot. *Leaves* all basal and arranged in a rosette, ascending or erect, elliptic-oblanceolate, (1–) 6–10 (–22) cm long, 0.2–1.5 (–4) cm wide, obtuse to acute, pubescent on both surfaces especially on the veins, 3-veined with the 2 lateral veins usually indistinct, the margins entire or toothed, tapering very gradually towards the slender petiole, the axil villous with long pale-brown hairs almost hidden by the broadened leaf-base. *Scapes* (1–) 10–20 (–40) cm long, pubescent-hirsute with the hairs irregularly spreading or antrorse. *Spikes* compact, cylindrical, (0.5–) 4–25 cm long. *Bracts* lanceolate to narrow-deltoid, 1.2–2.5 mm long, 0.4–1.4 mm wide, thickened, herbaceous, hirsute, keeled with a very narrow membranous margin. *Sepals* unequal; posterior sepals ovate-elliptic, slightly asymmetric, c. 2 mm long and 1.5 mm wide, keeled, pubescent-hirsute on the carina which is c. ⅓ of the total width; anterior sepals elliptic, 1.5–2.7 mm long, 0.6–1.0 mm wide with a broader membranous border on one side than on the other. *Corolla*: tube to 1 mm long; lobes narrow-ovate to lanceolate, (1.1–) 2.5–2.8 (–3.3) mm long, 0.5–0.8 mm wide, acute, with a distinct midvein, erect and imbricate in the fruiting stage. *Stamens* with filaments 0.4–0.8 mm long; anthers 0.2–0.3 mm long and wide, with a tapering apical appendage 0.1–0.3 mm long. *Style* c. 1.5 mm long. *Ovary* bilocular with 2 ovules in one loculus and one in the other, the placenta swollen towards the apex in the 2-ovulate loculus but no apical ovule present. *Capsule* ovoid, 2.5 mm long, 1.5 mm wide, the upper hardened and the lower membranous portions almost equal. *Seeds* 3, or rarely fewer by abortion, greenish, oblong-elliptic, 1.2–2.1 mm long, 0.8 mm wide, with a superficial hilum.

DISTRIBUTION: Naturalized in New South Wales and Queensland. Native in South America (Ecuador to Argentina).

Two subspecies are recognized (Rahn, loc. cit.) only one of which is naturalized in New South Wales; the other is confined to the highlands of Bolivia and Peru.

***P. myosuros** ssp. **myosuros**

Plants usually relatively large: leaves 3–10 (–25) cm long, scapes 5–20 (–40) cm, spikes (2–) 10–25 cm; except in unfavourable situations where they may be much reduced. *Leaves* weakly or strongly toothed. *Scape hairs* spreading. *Corolla lobes* 1.6–3.3 mm long, exceeding the anterior sepals. *Chromosome number*: $2n = 24$. Fl. Oct.-Dec.

Distribution: Naturalized in New South Wales on the southern edge of the North Coast (Hunter Valley) and on the Central Coast. Chiefly in pasture on soils derived from shales. Native to South America (Ecuador to Argentina). Also naturalized in southeast Queensland and in a few places in Europe.

North Coast: 10 km from Dungog on Stroud road, *Seur 303*, 9.1975; 8 km N. of Broke, *Coveny 5877, Hind & Hancock* 11.1974. Central Coast: Port Jackson, *Siegert 311*, 1884 (MEL); Marayong, *Hind 767*, 11.1972; Doonside to Rooty Hill, *Coveny NSW 99906*, 12.1965; Croydon Park, *Gray NSW 121620*, 12.1971; General Cemetery, Liverpool, *McBarron 13236*, 10.1966; 1.5 km W. of Casula, *Briggs NSW 99850*, 12.1967; 3.2 km SW. of Casula, *Coveny 5344, 5357*, 11.1973; 1 km S. of Leppington, *Briggs 4346*, 10.1971; Glenfield, *McBarron 8542*, 11.1963; Cemetery at Narellan, *McBarron 11427*, 10.1965; Camden, *Doust NSW 63428*, 11.1956.

A chromosome count on a collection of *P. myosuros* ssp. *myosuros* was incorrectly referred to *P. hirtella* Kunth by Briggs in Contr. New South Wales Natl. Herb. 4: 399 (1973).

P. myosuros, as naturalized here, is readily distinguished from all other species in New South Wales by the erect corolla-lobes which enclose the stamens and style and thus usually make the flower almost cleistogamous. This feature is shared with *P. australis* Lamk. which is naturalized in Victoria and Tasmania, but the latter species is a perennial, generally much larger than *P. myosuros*, and has a largely adventitious root-system rather than a persistent taproot.

5. *Plantago lanceolata *L.*, Sp. Pl. 1: 113 (1753); Bentham, Fl. Austral. 5: 138 (1870); F.M. Bailey, Queensland Fl. 4: 1210 (1901); F.M. Bailey, Compr. Cat. Queensland Pl.: 396 (1912): Hegi, Illustr. Fl. Mittel-Europa, 6: 183 (1914); Gardner, Enum. Pl. Austral. Occ.: 121 (1930); Ewart, Fl. Victoria: 1039 (1931); Pilger in Engler, Pflanzenr. 269, Heft 102: 313 (1937); Black, Fl. South Australia ed. 2, 4: 792 (1957); Sagar & Harper in Biol. Fl. British Isles, J. Ecol. 52: 189-221 (1964); Curtis, Stud. Fl. Tasmania 3: 560 (1967); Burbidge & Gray, Fl. Austral. Cap. Territory: 333, 335 (1970); Willis, Handb. Pl. Victoria 2: 604 (1972); Beadle, Evans & Carolin, Fl. Sydney Reg.: 432 (1972).

Synonymy: see Pilger in Engler, Pflanzenr. 269, Heft 102: 313 (1937).

Annual or biennial herb with a short caulorrhiza and a persistent taproot. *Leaves* all basal and arranged in a rosette, ascending or erect, lanceolate to elliptic-lanceolate, 8–20 cm long, 1–3 cm wide, pubescent or sericeous on both surfaces but sometimes sparsely so, the upper surface ± glossy, acute with some minute teeth on the margins, distinctly 5-veined, tapering very gradually into an indistinct but slender petiole which is usually purplish toward the base but broadening out into a whitish leaf-base obscuring the tuft of long silvery hairs in the axil. *Scapes* to 40 (–50) cm tall, ± pubescent with antrorse-appressed hairs, longitudinally ridged. *Spikes* ovoid to cylindrical, (0.5–) 1–9 (–12) cm long, compact. *Bracts* obovate to elliptic, 3–4 mm long, 1.5–2 mm wide, acuminate, mostly membranous, slightly keeled; the carina distinct, ± pubescent, usually less than ¼ of the total width. *Sepals* unequal: anterior sepals fused, the fused structure bifid, elliptic, 2.5–4.5 mm long, 1.2–2.5 mm wide, membranous but with two narrow herbaceous nerves; posterior sepals narrow-elliptic, to 2.5 mm long, 0.5–0.8 mm wide with a narrow herbaceous carina and a wider membranous border on one side than on the other. *Corolla*: tube to 3 mm long; lobes ovate, 1.5 mm long, 0.8 mm wide, acuminate with a distinct midvein. *Stamens* with filaments to 4 mm long; anthers 1.5–2 mm long, 0.8–1.2 mm wide. *Style* 4–5 mm long. *Ovary* bilocular with a single ovule in each loculus. *Capsule* ovoid, 3–4 mm long, 1.5 mm wide, upper portion cartilaginous, membranous lower portion c. 1 mm long. *Seeds* 1 or 2, ellipsoid, thick, 2.5–3 mm long, 1–1.5 mm wide, yellow to pale brown with the hilum confined in a narrow groove. *Chromosome number*: $2n = 12$ (rarely other numbers have been reported in European material, e.g. $2n = 13, 24, 96$). Fl: Sept.-April. "Plantain", "Lamb's Tongues", "Ribwort", "Ribgrass".

Distribution: Naturalized in New South Wales on the Coast, Tablelands, Slopes, Plains and on Lord Howe Island; more common in the southern half of the State. Abundant and widespread in pasture, along roads or paths and as a garden weed. Also in all other States but not recorded from the Northern Territory. Native to Europe and in North and Central Asia; very widely naturalized, particularly in temperate regions.

North Coast: 1.4 miles [2.2 km] S. of Eureka on road between Lismore and Mullumbimby, *Coveny 4367*, 8.1972; Ulmarra, *Long NSW 125533*, 12.1905. Central Coast: Wisemans Ferry, Hawkesbury River, 55 km NNW. of Sydney, *Briggs 4340*, 9.1971; Hornsby, *Blakely NSW 63449*, 11.1914; Wahroonga, *McComish NSW 84435*, 11.1943, *Salasoo 881*, 10.1951; Collaroy, *Crawford* 9.1963 (SYD); Pennant Hills, *Steel NSW 112969*, 9.1916; Beecroft, *Rodway NSW 100702*, 10.1947: Devlins Creek, Beecroft, *Johnson 7891*, 2.1975; Cheltenham, *Johnson NSW 67769*, 8.1946; Roseville, *Morris NSW 63438*, 9.1924; R.A.N. Armament Depot, Parramatta River, c. 3 miles [5 km] E. of Parramatta, *Constable 5532*, 11.1964; Governors Domain, (Sydney), *Camfield NSW 67755*, 12.1902; Sydney University Grounds, *Evans* 11.1925 (SYD); Tamarama Beach, c. 9 km SE. of Sydney, *Coveny 4207*, 5.1972; Dulwich Hill, *Aurousseau* 5.1933 (SYD); Cooks River, *Hamilton NSW 121787*, 11.1912; hills near Bulli, *Johnson* 1875 (MEL); Illawarra Lake, Kembla Grange, *Boorman NSW 121788*, 5.1921; Saddleback Mtn, Kiama, *Constable NSW 30984*, 1.1955; Berry, *Breakwell NSW 121789*, 3.1912; Meroo, lower slopes of Cambewarra Range, *Rodway NSW 121790*, 10.1939. South Coast: Nowra, *Rodway NSW 89653*, 1.1952; South Crookhaven Head, *Rodway NSW 121791*, 1.1941; Huskisson, Jervis Bay, *Rodway NSW 121792*, 10.1928; Tilba Tilba, *Reader* 11.1879 (MEL); Eden, *Rodway NSW 64714*, 1.1923. Northern Tablelands: Torrington, *Tobin NSW 121793*, 3.1948; Armidale, *Roe* 12.1948. Central Tablelands: Clergate, 10 km N. of Orange, *Briggs 6243 & Johnson* 11.1975; Bathurst, *Experimental Farm Manager NSW 121794*, 11.1940; S. side of South Bowenfels, *Briggs 6250 & Johnson* 11.1975; Jenolan Caves, *Blakely NSW 121795*, 2.1900; Grove Creek, Abercrombie area, *Constable NSW 121796*, 3.1955; between Fitzroy Falls and Moss Vale, *Rodway NSW 89656*, 9.1952. Southern Tablelands: Wologorong Creek, c. 18 km from Goulburn on road to Yass, *De Nardi 478*, 11.1970; 13 km NE. of Gunning, *Briggs 4501, 4502*, 4.1971; Acton, A.C.T., *Beeton CBG 001476*, 2.1962 (CBG); Turner, Canberra, A.C.T., *Pullen 60*, 2.1957 (CANB); Yarralumla, A.C.T., *Rawlinson 49*, 10.1964 (CBG); Canberra, *McKee 9664*, 11.1962; 2 km NW. of Foxlow, *Thompson 1020*, 1.1971; Michelago to Williamsdale, *Salasoo 3595*, 1.1969; Tumbarumba, *McBarron 4022*, 11.1949; between Prussian and Wragges Creeks, Kosciusko plateau, *Briggs 3393*, 3.1970. North Western Slopes: Castlereagh R at Coonabarabran, *Briggs 6219 & Johnson* 11.1975; Quirindi, *Briggs 6204*, 11.1975. Central Western Slopes: Parkville, *-NSW 121797*, 11.1938; 4 km SE. of Dubbo, *Briggs 6237 & Johnson* 11.1975; Ravensworth, *Briggs 6201 & Johnson* 11.1975; 2 km N. of Stuart Town, *Briggs 6239 & Johnson* 11.1975. South Western Slopes: Tumblong, 16 km SW. of Gundagai, *Briggs 4505*, 4.1971; Holbrook, *McBarron 14818*, 12.1967; Woomargama, *McBarron 14823*, 1.1968; *Briggs 4506*, 4.1971; Albury, *McBarron 2991*, 1.1949 (SYD); 3 km W. of Albury on Riverina Highway, *Briggs 4512, 4513*, 4.1971. Western Plains: Condobolin, *Cunningham 1549 & Milthorpe* 11.1973; 35 km N. of Griffith, *Cunningham 550*, 10.1972. Lord Howe Island: Neds Beach Road, *Pickard 2659*, 12.1975; main settlement, *Beauglehole 5631*, 11.1962 (CANB); cliffs 75 m above sea, W. slope of Mt Lidgbird, *Briggs 4814a*, 4.1974.

Pilger in Engler, Pflanzenr. 269, Heft 102; 313 (1937), recognizes several varieties differing largely in indumentum of the leaves and Bentham, Fl. Austral. 5: 138 (1870), refers some specimens to var. *eriophylla* Decaisne. However, in many areas, but most conspicuously on the South Western Slopes, stands commonly include both densely sericeous and sparsely pilose individuals. These may be separated on the ground by less than 1 m but the densely sericeous plants are mostly in the drier sites. On transplanting to moister garden conditions plants of both forms produced sparsely pilose growth. Böcher, Studies on variation and biology in *Plantago lanceolata,* Dansk Bot. Ark. 11: 1–18 (1943), found hairiness to be genetically determined but to increase as a phenotypic response to growth under drought conditions.

Teratological abnormalities of the inflorescence (e.g. branching or the presence of a rosette of small leaves at the top of the spike) occur frequently.

This species is distinguished from others occurring in New South Wales by the acuminate bracts, fused anterior sepals, and by the very compact spikes which are ovoid in early stages of flowering.

6. Plantago hedleyi *Maiden* in Proc. Linn. Soc. New South Wales 39: 379 (1914); Pilger in Engler, Pflanzenr. 269, Heft 102: 89 (1937).—TYPE: top of Mt Gower, Lord Howe Island, *T. Harvey Johnston NSW 121616,* 10.1910 (NSW HOLOTYPE).

Perennial with a long caulorrhiza to 1.5 cm thick and an adventitious root system at maturity. *Leaves* all basal, arranged in a rosette, ascending, narrow elliptic-lanceolate, (5–) 8–15 (–25) cm long, 2–3.5 (–4) cm wide, glossy, glabrous except for a few scattered hairs mainly on the veins, entire or irregular with some very small blunt teeth, subacute, 5–9-veined, tapering very gradually into a very broad base which obscures the minute tuft of axillary hairs. *Scapes* 10–20 (–25) cm tall, pubescent with long brownish hairs. *Spikes* 4–10 cm long. *Bracts* oblong-elliptic, 3.5–4 (–6) mm long, 1.5–1.8 mm wide, obtuse, glabrous except for the ciliate margin, ± keeled towards the base; the carina thickened, rigid, ⅓–½ of the total width. *Sepals* subequal, narrow-ovate, 3.5 mm long, 1 mm wide, acute, glabrous except for some of the exposed margins, with a distinct hard carina, membranous-scarious and yellow-brown towards the margin. *Corolla:* tube 3 mm long; lobes ovate, 1.5 mm long, 0.7 mm wide, acuminate with a distinct midvein. *Stamens* with filaments to 3 mm long; anthers 1 mm long, 0.8 mm wide. *Style* to 4 mm long. *Ovary* bilocular with 2 ovules in each loculus and a further ovule at the apex of one loculus separated from the lower 2 by a swelling of the placenta. *Capsule* ovoid, c. 2.5 mm long and 1.5 mm wide, the upper portion hardened, the lower membranous portion c. 1 mm long. *Seeds* to 5 in number, pale-brown, biconvex with a superficial hilum and a thin mucilaginous layer; lower seeds elliptic, c. 1 mm long; the upper seed smaller, irregular, angular, *Chromosome number*: $2n = 24$. Fl.: Sept.-Dec.

DISTRIBUTION: Lord Howe Island, on the upper slopes and summits of Mt Lidgbird and Mt Gower. In moist open situations on rocks, mostly above 500 m alt. but also at lower altitudes on cliff faces and at bases of cliffs.

LORD HOWE ISLAND: near the Goat House, NE. slope of Mt Lidgbird, *Hoogland 8813,* 11.1963 (CANB, NSW), *Pickard 1333,* 9.1970, *Rodd 1827,* 3.1971, *Briggs 4813,* 4.1972; eastern face of Mt Lidgbird, *Watts NSW 121613,* 8.1911; W. side of Mt Lidgbird, *Beauglehole 5630,* 11.1962 (CANB); SE. side of Mt Lidgbird, *Beauglehole 5629,* 11.1962 (CANB); slopes of Mt Lidgbird at c. 1200 ft [360 m], *McComish 158,* 3.1938; summit ridge of Mt Lidgbird, *Pickard 1473,* 5.1971; upper slopes of N. side of Mt Gower, *Hoogland 8789,* 11.1963 (CANB); summit of Mt Gower, *Maiden, Hedley & Dun* 4.1898, 9.1898 (K); *Hedley & Dun NSW 63389,* 9.1908, *Fullager* (MEL), *Pickard NSW 121614,* 9.1970; high up on the sides of Mt Gower, *Fullager* (MEL); Lord Howe Island, *Maiden NSW 121615,* 4.1898, *McComish NSW 121617,* 12.1938.

The date of collection for the holotype is given as 12.1910 in the protologue and on the herbarium label of the sheet, however Johnston indicates in an accompanying note to Maiden that it was collected in October. The date "7.12.10" appears to have been added later, and presumably is the date of receipt at NSW.

P. hedleyi is regarded by Pilger (loc. cit.) as allied to species of various islands of the eastern Pacific Ocean, and also the Auckland Islands and St Helena.

However, Section *Palaeopsyllium* also includes species of tropical and southern Africa as well as of North and South America.

The large glabrous leaves as well as the long, narrow, rigid bracts and sepals of this species are distinctive.

7. **Plantago glacialis** *Briggs, Carolin et Pulley* in Contr. New South Wales Natl. Herb. 4: 395 (1973).—Type: SE. slope of Muellers Peak, Kosciusko area, N.S.W., alt. 2010 m, c. 36° 26′ S 148° 16′ E, *B.G. Briggs 4033 & R. Carolin* 2.1971 (NSW Holotype) upper left specimen on sheet.

Perennial with a thickened and much branched caulorrhiza largely covered with decaying leaf-bases and often forming an extensive turf, with an adventitious root-system at maturity. *Leaves* crowded in the rosettes, ascending, linear-elliptic to oblanceolate, (0.8–) 2–4 (–7) cm long, (1.5–) 8–18 mm wide, thick, glossy, with 1 prominent vein, dotted with hydathodes, entire or with distant obscure teeth, glabrous or with long multicellular hairs occurring singly at intervals on the adaxial edge of the margin near the teeth or rarely pubescent on the upper surface, narrowing gradually into a slightly sheathing petiole with a tuft of golden-brown hairs in the axil. *Scapes* about as long as the leaves at flowering, 1–5 (–20) in number, glabrous or rarely pubescent. *Spikes* capitate, (1–) 2–3 (–5)-flowered. *Bracts* triangular, acute, 1.5–3 mm long, 1–2 mm wide, glabrous, with a broad herbaceous carina ¼–⅓ of the total width. *Sepals* subequal, elliptic, 2–2.2 mm long, 1–2.2 mm wide, glabrous with a narrow carina. *Corolla*: tube 1.5–2 mm long; lobes elliptic, 0.7–1.2 mm long, 0.5–0.8 mm wide, acute with a prominent midvein. *Stamens* with filaments 4–7 mm long: anthers 1 mm long, 0.5–0.8 mm wide. *Style* 5–6 mm long. *Ovary* bilocular with 2 ovules in each loculus. *Capsule* ellipsoidal, 2 mm diam., obtuse, the upper hardened portion c. 2 mm long, the lower membranous portion 1–1.5 mm long. *Seeds* usually 4 in number, elliptic, 1.5–1.8 mm long, c. 1 mm wide, biconvex, reddish-brown with a superficial hilum and a very thin mucilaginous layer. *Chromosome number*: $2n = 12$. Fl.: Jan.-Mar.

Distribution: Southern Tablelands of New South Wales; alpine zone of the Kosciusko plateau above 2000 m alt., in cold seepage areas below snow patches. Also in Victoria (Bogong High Plains).

Southern Tablelands: all from Mt Kosciusko plateau: E. of Mt Anderson in Ponds Creek Valley, *McVean* 3.1967 (CANB); Mt Townsend, *Mercer* 2.1946 (SYD); slopes of Mt Twynam above Blue Lake, *Willis* 2.1946 (MEL); Blue Lake, *Phillips CBG 001477*, 3.1962 (CBG); Lake Albina, *Coveny 2732 & Pickard* 3.1970; above Lake Albina, on Blue Lake Track, *Phillips CBG 003692*, 1.1964 (CBG); Club Lake, *Johnson NSW 15764*, 1.1951, *McVean* 1.1967 (CANB); near Club Lake Creek, *Eichler 13655*, *13656*, 2.1957 (AD); Hedley Tarn near Blue Lake, *Carolin* 2.1971 (SYD); 2 km SSW. of Hedley Tarn, *Briggs 4014 & Carolin* 2.1871; Carruthers Peak, Main Range, *Telford 3064*, 1.1972 (CBG); Muellers Peak, *Martin* 1.1963 (SYD); between Mt Kosciusko and Carruthers Peak, *Phillips CBG 022148*, 2.1966 (CBG); Mt Kosciusko to Lake Albina Track, *Gray 6333 & Totterdell* 2.1969 (CANB); 1 km NNE. of Mt Kosciusko summit, *Briggs 2625*, 3.1969, *4533*, 4.1972; below Mt Kosciusko summit 7000 ft [2100 m], *Crawford* 3.1963 (SYD), *Carolin B118*, 3.1957 (SYD); Upper Snowy R below road bridge, 1920 m alt., *Thompson 1433*, 1.1972; Snowy R bridge between Charlottes Pass and Seamans Hut, *Gray 6450 & Totterdell* 4.1970 (CANB); Lake Cootapatamba, *Rolls* 1.1965 (SYD); S. of foot of Mt Clarke above Rawsons Creek, *Tindale 4057b & Wimbush* 1.1975; Rawsons Pass, alt. 1090 m, *Coveny 5371*, *5375*, 3.1974; Mt Stilwell, *Johnson & Constable NSW 15769*, 1.1951; Mt Kosciusko 7000 ft [2100 m], *Beadle* 2.1952 (SYD), *Bäuerlen NSW 63360*, 2.1890, *Gauba CBG 001467*, 1.1952 (CBG), tree line to 7000 ft [2100 m], *Maiden & Forsyth NSW 63363*, 1.1899, 5800 ft [1740 m], *Beadle* 2.1952 (SYD); Mt Kosciusko (as Coskiusko), *Mueller* - (MEL); Mt Kosciusko, *Helms NSW 63365*, 2.1893, *Maiden & Forsyth NSW 63362*, 1.1899, *Skottsberg & Costin NSW 63364*, 3.1949, *Gray 4809*, 3.1960 (CANB); sources of the Snowy River, [*Mueller*] (MEL, labelled as *P. stellaris β angustifolia*); summit of the Snowy River, *Mueller* (K, on same sheet as isolectotype of *P. muelleri*).

Costin, A Study of the Ecosystems of the Monaro Region of New South Wales: 226, 248 (1954), referred to material of this species as *P. muelleri* forma *angustifolia* but did not validly publish this name. Mueller had annotated herbarium material as *P. muelleri β angustifolia.*

P. glacialis was included in *P. gunnii* Hook. f. by F. Mueller in Fragm. 8: 148 (1874), Moore & Betche, Handb. Fl. New South Wales: 314 (1893), and Maiden & Betche, Census New South Wales Pl.: 186 (1916). It was included by Mueller in his circumscription of *P. stellaris* F. Muell. and was illustrated under this name in his Pl. Indig. Colony Victoria, Lithogr.: pl. 66 p.p., upper left figure and Figs. 1, 2, 4 and 13 (it is difficult to determine the specific identity of some of the other floral structures illustrated).

This species has previously been confused with *P. muelleri* and the Tasmanian *P. gunnii* Hook. f. It differs from *P. muelleri* in the generally smaller size of rosettes, the narrower leaves, and the scapes which are elongated at anthesis. From *P. gunnii* it is distinguished by its larger size, mostly glabrous or subglabrous leaves, and inflorescences usually with more than one flower. It resembles *P. aundensis* Royen, of high altitudes in New Guinea, but differs in the scapes which are elongated at anthesis and in the less prominent axillary hairs.

8. Plantago muelleri *Pilger* in Pflanzenr. 269, Heft 102: 118 (1937); Willis, Handb. Pl. Victoria 2: 605 (1973); Briggs, Carolin & Pulley in Contr. New South Wales Natl. Herb. 4: 397 (1973).—*P. stellaris* F. Muell., Fragm. Phytogr. Austral. 2: 23 (1860), *nom. illegit.* (non *P. stellaris* Salisb. 1796); F. Mueller, Pl. Indig. Colony Victoria, Lithogr.: pl. 66 p.p. (1865) excluding the upper left figure and Figs. 1, 2, 4 and 13 which are *P. glacialis* (it is difficult to determine the specific identity of some of the other floral structures illustrated); Moore & Betche, Handb. Fl. New South Wales: 314 (1893); Maiden & Betche, Census New South Wales Pl.: 186 (1916).—TYPE: Sources of the Murray River, *Dr F. v* [*Mueller*] (MEL 1432 LECTOTYPE) originally labelled *P. stellaris α latifolia;* Sources of the Murray, *F. v. Mueller* c. 1854 (MEL 501205, K– 2 sheets, excluding material of *P. glacialis*– ISOLECTOTYPES).

Perennial, with a thickened caulorrhiza up to 2 cm long and 1 cm thick and with an adventitious root-system at maturity. *Leaves* all basal, arranged in a rosette (4–) 6–10 (–18) cm diam., spreading, slightly arcuate-ascending, elliptic to lanceolate (1.5–) 2.5–8 (–11.5) cm long, (5–) 7–15 (–20) mm wide, thick, leathery, glossy, dotted with hydathodes, glabrous, 3-veined, entire or with distant, obscure, obtuse teeth on the margin, narrowing very gradually towards the base which is only slightly sheathing and thus does not conceal the axillary tuft of long golden-brown hairs. *Scapes* 1–2 mm long at flowering, the spike being hidden amongst the leaf bases, elongating after flowering to be as long or longer than the leaves, pubescent with antrorse-appressed hairs, initially thick and fleshy (to 3 mm diam.) but decreasing in diam. to 1–2 mm at fruiting stage. *Spikes* subcapitate or rarely to 8 mm long in fruit, 2–13-flowered, with a tuft of white hairs at the base of each flower. *Bracts* ovate, 2.4–3.5 mm long, 1.2–2 mm wide, glabrous, obtusely keeled, the carina ± herbaceous and ¼–⅓ of the total width. *Sepals* subequal, elliptic, 2.5–3.5 mm long, (1.1–) 1.3–2 mm wide, glabrous, acute, with a carina similar to that of the bracts. *Corolla*: tube 2.5–3 mm long; lobes elliptic-ovate, 1.4–2 mm long, 0.6–1 mm wide, acute with a prominent midvein. *Stamens* with filaments to 6 mm long; anthers 1 mm long, 0.8–1 mm wide. *Style* to 10 mm long. *Ovary* bilocular with 2 ovules in each loculus. *Capsule* ellipsoid-globular, 2.5–4 mm long, 2–2.5 mm diam., the upper portion hardened and glossy, the lower portion membranous. *Seeds* to 4 in number, ovate, 1–2 (–2.5) mm long, 0.9–1.2 mm wide, yellowish-brown, biconvex with a superficial hilum and a thin mucilaginous layer. *Chromosome number*: $2n = 36$. Fl.: Dec.-Mar.

DISTRIBUTION: Southern Tablelands of New South Wales, Mt Kosciusko plateau and Brindabella Range, in moist sites, in fens, on stream banks and below snow patches in the alpine and subalpine zones, above 1600 m alt.

SOUTHERN TABLELANDS: Mt. Gingera, A.C.T., by stream below summit, *Pulley 359,* 10.1969 (CBG). The following are all from the Kosciusko plateau:— Snowy R, between Guthega Dam and Spencers Creek, *Thompson 1001,* 1.1971; Perisher Valley, *Briggs 4369,* 10.1971; near Betts Creek S. of the Paralyser, *Eichler 13451,* 1.1957 (AD); site of Betts Camp, Betts Creek, *Briggs 4371,* 10.1971; Spencers Creek near the road bridge, *Thompson 375, 408,* 1.1970; Mt Stilwell, *Johnson & Constable NSW 15770,* 1.1951; slopes of Mt Twynam above Blue Lake, *Willis* 2.1946 (MEL); Blue Lake, Kosciusko, *Phillips CBG 001478,* 3.1962 (CBG), *Telford 3059,* 1.1972 (CBG); below Club Lake, *Johnson NSW 18413,* 1.1951; 0.5 km SW. of Hedley Tarn, *Briggs 4008 & Carolin* 2.1971; at the bottom of Charlottes Pass, *Crawford,* 3.1963 (SYD); Snowy R 1 km WNW. of Charlottes Pass, 1620 m alt., *Briggs 4011,* 2.1971; between [Kosciusko] summit and Charlottes Pass, *Burbidge 3733,* 2.1952 (CANB, NSW); Northcote-Lee Saddle, *Briggs 4032 & Carolin* 2.1971 (NSW, SYD); Lake Albina, 17 miles [27 km] W. of Jindabyne, *Coveny 2734 & Pickard* 3.1970; between Mt Kosciusko and Carruthers Peak on Blue Lake Track, *Phillips CBG 022143,* 2.1966 (CBG); SE. slope of Muellers Peak, *Briggs 4030 & Carolin* 2.1971; 1 km NNE. of Mt Kosciusko summit, *Briggs 2627,* 3.1969; col below Mt Kosciusko summit, *Burbidge 3943,* 2.1955 (CANB); summit of Mt Kosciusko, *Stirling 13,* 1.1884 (MEL); Mt Kosciusko, near summit, *Carolin B113,* 3.1957 (SYD), *Briggs 4533,* 4.1972; Rawson Pass, *Coveny 5371,* 3.1974; Upper Snowy R below road bridge, *Thompson 1433 p.p.,* 1.1972; Merritts Creek, *Thompson 954,* 1.1971; near Seamans Hut, *Tindale 4055 & Wimbush* 1.1975; near Snowy R bridge below Seamans Hut, *Gray 6202 & Totterdell* 2.1968 (CANB), *Gray 6451 & Totterdell* 4.1970 (CANB); just above Lake Cootapatamba, *Ashby 1423,* 1.1965 (AD); below Lake Cootapatamba, *Gray 6391 & Totterdell* 3.1969 (CANB); Alpine Way track near Ramshead, *Martin* 1.1963 (SYD); Mt. Kosciusko, tree line to 7000 ft [2100 m], *Maiden & Forsyth NSW 63380,* 1.1899; 6800 ft [2050 m], *Helms NSW 63378,* 2.1901; 7000 ft [2100 m], *Gauba CBG 001463,* 1.1952; Mt Kosciusko, *Kretschman NSW 63379,* 12.1892, *Forsyth NSW 63381,* 1.1899, *Martin* 1.1957 (SYD); Munyang Mountains, alt. 6–7000 ft [1800-2100 m], *Mueller* 1.1874 (MEL).

Costin, A Study of the Ecosystems of the Monaro Region of New South Wales: 226, 248 (1954), referred to material of this species as *P. muelleri* forma *latifolia* but did not validly publish this name. Mueller had annotated herbarium material as *P. muelleri α latifolia*.

Bentham, Fl. Austral. 5: 141 (1870), included *P. muelleri,* together with dissimilar material from Tasmania, under *P. brownii* Rapin, which is now regarded as a synonym of *P. triantha* Spreng. [see Pilger, loc. cit. 119; Allan, Fl. New Zealand 1: 782 (1961)]. *P. triantha* occurs in coastal areas of Tasmania and on the Auckland Islands, south of New Zealand.

Moore [in Valentine, Taxonomy, Phytogeography and Evolution, Academic Press, London (1972)] refers to chromosome numbers of both $n = 6$ and $n = 18$ in *P. muelleri*; presumably the former number was actually counted on material of *P. glacialis.*

Curtis, Stud. Fl. Tasmania 3: 564 (1967), includes Tasmanian material under *P. muelleri* but notes that "the Tasmanian plants differ somewhat from the type particularly in habit and may, on further study, prove to represent a distinct species". We have not seen Curtis's material or any other specimen from Tasmania referable to *P. muelleri.*

P. muelleri shows similarities to *P. palustris* and to *P. glacialis* but the glossy glabrous leaves and elongation of the scapes after anthesis together distinguish it from other New South Wales species. The usually broader leaves and more numerous flowers in the inflorescence distinguish it from *P. aundensis* Royen of the New Guinea highlands. The glabrous leaves separate it from the New Zealand *P. lanigera* Hook. f.

9. Plantago palustris *Fraser et Vickery* in Proc. Linn. Soc. New South Wales 62: 291 (1937).—TYPE: Barrington Tops, in swamps at 4800 ft [c. 1450 m], *Fraser & Vickery NSW 63348,* 1.1934 (NSW HOLOTYPE, SYD).

Perennial with a short thick caulorrhiza and an adventitious root-system at maturity. *Leaves* in a rosette, ascending, lanceolate to elliptic, 3–10 cm long, 4–10 mm wide, with a dull sheen when fresh, acute, glabrous or rarely sparsely and often unevenly pubescent, sometimes with conspicuous transverse bands of hairs, entire or with a few obscure teeth, 3-veined with the midvein prominent on the abaxial surface, narrowing gradually towards the broadened and slightly scarious base which obscures the axial tuft of golden-brown hairs. *Scapes* 2–8 in number, 1–2 mm long at flowering, the spikes at first hidden among the leaf bases but elongating after flowering and becoming longer than the leaves, 1(–2) mm diam., pubescent particularly towards the apex. *Spike* subcapitate, 3–9-flowered with tufts of hairs between the flowers. *Bracts* ovate, 1–2 mm long, 0.8–1.5 mm wide, glabrous, acute, ± keeled, the carina about ¼ of the total width. *Sepals* subequal, narrow-elliptic, 2.3–3 mm long, 0.8–1 mm wide, glabrous, acute, ± keeled, the carina narrow and herbaceous. *Corolla*: tube 3 mm long; lobes elliptic-ovate, c. 1.8 mm long, 0.8 mm wide. *Stamens* with filaments 4–5 mm long; anthers 0.5 mm long, 0.4 mm wide. *Style* 5–6 mm long. *Ovary* bilocular with 2 ovules in each loculus. *Capsule* ellipsoid to globular, 3–4 mm long, 2–3 mm diam., with a median dehiscence line, the upper portion hardened, the lower portion membranous. *Seeds* up to 2 in each loculus, elliptic, 1.8 mm long, 1 mm wide, light yellowish-brown, biconvex with a superficial hilum and a thin mucilaginous layer. *Chromosome number*: $2n = 24$. Fl.: Nov.-Jan.

DISTRIBUTION: South-eastern end of the Northern Tablelands of New South Wales, at Barrington Tops. In and around swamps, above 1350 m alt.

NORTHERN TABLELANDS: all from Barrington Tops: Beean Beean Creek, *Johnson NSW 63347,* 12.1954; Polblue Creek, 4900 ft [1470 m], *Pulley 683,* 2.1971 (CBG); Barrington Tops, *Fraser, Vickery & Burges* 1.1934 (SYD); *Fraser NSW 63346,* 12.1930, *Carolin 496,* 4.1958 (SYD).

This species is closely allied to *P. muelleri* of the Southern Tablelands, from which it is distinguished by its narrow leaves with a dull sheen, and by the narrower bracts of the upper flowers.

10. P. alpestris *Briggs, Carolin et Pulley* in Contr. New South Wales Natl. Herb. 4: 395 (1973)—TYPE: Col between Mt Lee and Mt Northcote, Kosciusko plateau, New South Wales, 2010 m alt., c. 36° 25′ S 148° 17′ E, *B. G. Briggs 4031 and R. Carolin* 2.1971 (NSW HOLOTYPE, SYD).

Perennial with a thick caulorrhiza up to 2 cm long and c. 5 mm thick with an entirely adventitious root-system at maturity. *Leaves* all basal, arranged in a rosette, spreading close to the ground, oblanceolate-elliptic to obovate-elliptic, (2–) 6–8 cm long, (0.7–) 1–2 (–2.5) cm wide, obtuse or acute, entire, with a satin surface when fresh, 3-veined but the lateral veins somewhat obscure, tapering very gradually into an indistinct petiole with a broadened ± scarious base, the axil villous with a conspicuous tuft of yellow-brown hairs. *Scapes* 8–16 cm long, pubescent. *Spikes* compact, ovoid to cylindrical, 1.5–3 cm long. *Bracts* concave, ovate, 2–2.5 mm long, 1.5–2 mm wide, obtuse, membranous towards the margin, mostly glabrous but sometimes with a few long hairs at the apex, obtusely keeled, the carina thickened and often purplish, the axil with a tuft of hairs. *Sepals* elliptic, almost equal, 1.5–1.8 mm long, 0.8–1 mm wide, glabrous, ± keeled (particularly towards the base) the thickened carina about ⅓ of the total width, the margins membranous. *Corolla*: tube 1.5–1.8 mm long; lobes broad ovate-deltoid, acute, 1–1.2 mm long, 0.8–1 mm wide, with a distinct midvein. *Stamens* with filaments to 5 mm long; anthers c. 1 mm long, 0.8–1 mm wide. *Style* 3.5–4 mm long. *Ovary* bilocular, each loculus with 2 ovules but one loculus with a swelling of the placenta near the apex separating a minute sterile false-loculus. *Capsule* broad-ovoid, 2.5–2.8 mm long, 2.3–2.5 mm wide, with a blunt mucro at the apex, the upper section hardened, the lower section membranous. *Seeds* 2 in each loculus, dark-brown, oblong to elliptic, 1.5 mm long, 0.5–0.8 mm wide, with a superficial hilum and a thin mucilaginous layer. *Chromosome number*: $2n = 12$. Fl.: Dec.-Mar.

DISTRIBUTION: Southern Tablelands of New South Wales, above 1600 m alt. on the Kosciusko plateau and the nearby Mt Jagungal. In moist sites in the alpine and subalpine zones, on peaty or gravelly soils of creek banks, at edges of bogs and in shallow depressions in alpine and subalpine grassland. Also in Victoria (Mt Baw Baw and Mt Buffalo).

SOUTHERN TABLELANDS: Mt Jagungal, ¼ mile (0.4 km) SE. of summit (c. 35 km N. of Mt. Kosciusko), *Rodd 743*, 12.1968. The following are all from the Mt. Kosciusko plateau:—Prussian Creek, 2 km SE. of Smiggin Holes, *Briggs 3375a, 3376*, 3.1970; Snowy R between Guthega Dam and Spencers Creek, *Thompson 1382*, 1.1972; near Betts Creek S. of the Paralyser, *Eichler 1347*, 1.1957 (AD); Blue Lake, *Totterdell 217*, 3.1971 (CANB), *Telford 3060*, 1.1972 (CBG); near Club Lake, *Carolin B74*, 2.1957, *B120*, 3.1957 (SYD); Lake Albina, *Pickard & Coveny 2735*, 3.1970; NW. slope of Mt Northcote, *Briggs 4023 & Carolin* 2.1971; Mt Kosciusko-Lake Albina track, *Gray 6363 & Totterdell* 2.1969 (CANB); 1 km WNW. of Charlottes Pass at Snowy R crossing, *Briggs 4010 & Carolin* 2.1971; Snowy R below Charlottes Pass, *Carolin* 2.1971 (SYD); 1 km NNE. of Mt Kosciusko summit, *Briggs 2626*, 3.1969, *Briggs 4531*, 4.1972; c. 1½ miles [c. 2.5 km] beyond Charlottes Pass towards summit of Mt Kosciusko, *Gray 6452, 6455 & Totterdell* 4.1970 (CANB); Charlottes Pass to Seamans Hut, Kangaroo Range, *Gray 6294 & Totterdell* 2.1969 (CANB); Kangaroo Range, *Gray 6293 & Totterdell* 2.1969 (CANB, NSW); near Snowy R bridge below Seamans Hut, *Gray 6594, Costin & Totterdell* 2.1972 (CANB); Merritts Creek, *Briggs NSW 78783*, 1.1965; Rawson Pass, *Coveny 5378*, 3.1974; 1 km NE. of Lake Cootapatamba, *Briggs 4034 & Carolin* 2.1971; above Lake Cootapatamba, *Rolls* 1.1965 (SYD); below Lake Cootapatamba, *Gray 6390 & Totterdell* 3.1969 (CANB); Thredbo R Gorge, *Johnson & Constable NSW 18422*, 1.1951; headwaters of Big Boggy Creek, c. 10 km SE. of Mt Kosciusko summit, *Briggs 3331*, 3.1970; Kosciusko, *Beadle* 2.1952 (SYD); tree line to 7000 ft [2100 m], *Maiden & Forsyth NSW 63393*, 1.1899; Mt Kosciusko, *Rupp NSW 63394*, 12.1912, *Skottsberg & Costin NSW 63392*, 3.1949, *Beadle* 2.1952 (SYD), *Gauba CBG 001466*, 1.1953 (CBG); Munyang Mtns, *Mueller* 1.1855 (MEL).

Material probably belonging to this species was referred to *P. tasmanica* Hook. f. by Ewart, Fl. Victoria: 1039 (1931) and Willis, Handb. Pl. Victoria 2: 606 (1973).

Distinguished from other New South Wales species occurring at high altitudes by the relatively short but not capitate spike and, when fresh, the satin sheen of the leaves. Apparently allied to the Tasmanian *P. daltonii* Decaisne, *P. tasmanica* Hook.f. and *P. glabrata* Hook.f. Differing from *P. daltonii* and *P. tasmanica* in the broad leaves with 3–5 distinct nerves and the usually broad and indistinct petiole. Distinguished from *P. glabrata* by the more prominently thickened bracts and sepals, the scarcely fringed bracts and the shorter anthers.

11. Plantago euryphylla *Briggs, Carolin et Pulley* in Contr. New South Wales Natl. Herb. 4: 396 (1973).—TYPE: 1 km SW. of Blue Lake, Kosciusko Plateau, New South Wales, 6.5 km NE. of Kosciusko summit, 1920 m alt., c. 36° 25′ S 148° 18′ E, *B. G. Briggs 4002 & R. C. Carolin* 2.1971 (NSW HOLOTYPE).

Perennial with a thick caulorrhiza up to 2 cm long and 1 cm diam., and with an adventitious root-system at maturity. *Leaves* all basal and arranged in a rosette, spreading close to the ground, obovate-spathulate, 3–10.5 cm long, 1.3–4 cm wide, obtuse, pubescent on both surfaces but more densely so on the lower, gloss on the upper surface inconspicuous because of the pubescence, 5

(–9)-veined, tapering very gradually into a very indistinct petiole with a thickened base which is membranous at the margins, the axil villous with a conspicuous tuft of brownish-yellow hairs. *Scapes* ascending (6–) 10–20 (–30) cm tall, c. 1.5 mm diam., pubescent with the hairs ± antrorse-appressed. *Spikes* compact, narrow-cylindrical, 4–8 (–11) cm long in fruiting stage. *Bracts* concave, ovate-elliptic, obtuse, 1.9–3 mm long, 0.9–1.5 (–1.8) mm wide, obtusely keeled, glabrous except for the usually ± ciliate margin and apex, membranous towards the margin, with the thickened carina c. ⅓ of the total width. *Sepals* elliptic, 1.5–2.5 mm long, 1–2 mm wide, glabrous, ± keeled, usually tinged with purple, obtuse, membranous except for a carina c. ¼ of the total width. *Corolla*: tube 1.5–2.5 mm long; lobes orbicular to broad-ovate, 0.5–1 mm long, 0.5–1 mm wide with a distinct midvein. *Stamens* with filaments 2.5–3 mm long; anthers 0.6–1.2 mm long, 0.5–0.9 mm wide. *Style* 1.5–3 mm long. *Ovary* bilocular with 2 ovules in each loculus, the placenta with a swelling on one side towards the apex separating a minute sterile false-loculus. *Capsule* broad-ovoid, 2.5–3.5 mm long, 1.5–2 mm wide, with a blunt mucro at the apex, the upper portion hardened, the membranous lower portion 1–1.5 mm long. *Seeds* 2 in each loculus, brown, narrow-elliptic, 1.2–1.8 mm long, 0.7–1 mm wide, with a superficial hilum and a very thin mucilaginous layer. *Chromosome number*: $2n = 12$. Fl.: Dec.-Mar.

DISTRIBUTION: Southern Tablelands of New South Wales, Brindabella Range to Kosciusko Plateau. In alpine herbfield and subalpine grassland above 1500 m alt. Also in the Eastern Highlands of Victoria.

SOUTHERN TABLELANDS: Brindabella Range, A.C.T., on eastern slope of Mt Gingera, *Pulley 802*, 5.1971 (CBG); Jagungal, alt. 6500 ft [1950 m], *Gauba CBG 001470*, 2.1951 (CBG); Black Flat Creek, ¾ mile [1.2 km] ESE. of the Grey Mare Hut (upper Geehi River district, c. 28 km N. of Mt Kosciusko), *Rodd 751*, 12.1968. The following are all from the Kosciusko plateau:—Schlink Pass road, spur above descent to Geehi, alt. 5500 ft [1650 m], *Phillips CBG 003693*, 1.1964 (CBG); Daners Gap, *Briggs 4368*, 10.1971, *4534*, 4.1972, *Thompson 1278*, 1.1972; on slope above NE. side of Guthega Dam, *Thompson 288*, 1.1970; Prussian Creek, 2 km SE. of Smiggin Holes, *Briggs 3375*, 3.1970; Blue Cow Creek, *Thompson 328*, 1.1970; Perisher Gap, *Phillips CBG 022146*, 4.1967 (CBG); Perisher Valley, *Crawford* 3.1963 (SYD); Betts Camp, *Maiden NSW 63377*, 2.1964; site of Betts Camp, Betts Creek, *Briggs 4370*, 10.1971; Mt Stilwell 6500 ft [1950 m], *Johnson & Constable NSW 15774*, 1.1951; near Lake Albina, *Gray 6331 & Totterdell* 2.1969 (CANB), *Pickard & Coveny 2726*, 3.1970; 2 km NW. of Charlottes Pass, between Hedley Tarn and Snowy R crossing, *Briggs 4012 & Carolin* 2.1971; Snowy R below Charlottes Pass, *Carolin B69*, 2.1957 (SYD); *Telford 3063*, 1.1972 (CBG), *Wilson 452*, 3.1957, *Carolin 2.1971* (SYD); Muellers Peak, *Briggs 4029 & Carolin* 2.1971 (NSW, SYD); Kangaroo Range 1 mile [1.5 km] beyond Charlottes Pass towards summit of Mt Kosciusko, *Gray 6449 & Totterdell* 4.1970 (CANB); headwaters of Big Boggy Creek c. 10 km SE. of Mt Kosciusko summit, *Briggs* 3332, 3.1970.

References to *P. tasmanica*, as a constituent of alpine herbfield and sod tussock grasslands, by Costin, A. B., A Study of the Ecosystems of the Monaro Region of New South Wales, (1954), apply to this species.

This species has been confused with *P. antarctica*, which occurs at lower altitudes, but it is distinguished by the adventitious root-system and smaller flowers (particularly the smaller anthers).

12. Plantago cladarophylla *Briggs, Carolin et Pulley* in Contr. New South Wales Natl. Herb. 4: 396 (1973).—TYPE: Barrington Tops, N.S.W., in Polblue Creek, amongst rocks in creek, 4900 ft [1470 m], *J. Pulley 686 and I. Telford* 2.1971 (NSW HOLOTYPE, CBG 039124, MEL, CANB, AD, ADW, BRI, UNE, NT, SYD).

Perennial herb with a short thick caulorrhiza to 10 mm long, with an adventitious and often also a primary root-system at maturity. *Leaves* all basal, arranged in a rosette, usually ± erect, linear-elliptic to lanceolate or elliptic (3.5–) 7–26 cm long, 8–22 mm wide, acute, entire or with a few widely spaced, obtuse teeth with tufts of hairs on the dorsal surface towards the base of each tooth, the rest of the lamina usually almost glabrous but sometimes with some hairs on the abaxial surface of the veins, tapering very gradually towards the broadened base which obscures the grey-brown tuft of axillary hairs. *Scapes* 1–5 in number, sparsely pubescent to almost glabrous, slightly striate, 10–30 cm long at flowering. *Spike* becoming loose in fruiting stage (3–) 10–13 cm long, narrow-cylindrical. *Bracts* concave, elliptic to ovate, acute, 2–3 mm long, 1–1.5 mm wide with a glabrous to slightly pubescent prominent but scarcely keeled thickened strip c. ⅔ of the total width. *Sepals* subequal, elliptic, 1.8–2 mm long, 1.2–1.5 mm wide with a narrow carina c. 0.2 mm wide. *Corolla*: tube 1.8–3 mm long; lobes ovate, acute, 1.2–1.9 mm long, c. 1 mm wide with a prominent mid-vein. *Stamens* with filaments to 4 mm long, anthers 1–1.5 mm long. *Style* 2.5–5 mm long. *Ovary* bilocular, one loculus with 2 ovules, the other with 3, the apical ovule in a false loculus separated from the lower 2 by a swelling of the placenta. *Capsule* ovoid, 4–5 mm long 2–3.3 mm wide, acute with scarcely any mucro, the upper portion hardened, the lower persistent membranous portion c. 1.5 mm long. *Seeds* to 5 but usually reduced to 2, elliptic, 2 mm long, 1 mm wide, biconvex, dark-brown with a superficial hilum and a thin mucilaginous layer. *Chromosome number*: $2n = 36$. Fl.: mostly Aug.-Jan.

DISTRIBUTION: Southern end of the Northern Tablelands, on Barrington Tops and Gloucester Tops plateaus. In swamps, on stream banks and rarely in subalpine herbfield, mostly c. 1500 m alt.

NORTHERN TABLELANDS: Gloucester Tops, 37 miles [60 km] from Gloucester, *Pulley 719*, 2.1971 (CBG, NSW). The following are all from Barrington Tops plateau:—near Polblue Creek, *Pulley 688 & Telford* 2.1971 (CBG); near head of Polblue Swamp, *Briggs 3169 & Johnson* 3.1970; East Barrington Tops, *Schodde 3224*, 2.1963; Little Murray Creek, *Telford 2696*, 2.1971 (CBG); Barrington Tops, *Fraser NSW 63369*, 8.1928, 5000 ft [1500 m], *Burges* 8.1930 (SYD), in swamp, *Fraser & Vickery NSW 63368*, 1.1934, swamps c. 5000 ft [1500 m], *Carolin* 6.1957, 5000 ft [1500 m], *Carolin 494*, 4.1958 (SYD, UNE).

P. cladarophylla has a distinctive combination of long flowering spikes, slender leaves, short glabrous sepals and rounded or flattened (rather than angled) thickening along the midrib of the sepal.

13. Plantago debilis *R. Br.*, Prodr.: 425 (1810); Decaisne in Candolle, Prodr. 13 (1): 701 (1852); Bentham, Fl. Austral. 5: 139 (1870); F. M. Bailey, Queensland Fl. 4: 1210 (1901); F. M. Bailey, Compr. Cat. Queensland Pl.: 396 (1912); Pilger in Engler, Pflanzenr. 269, Heft 102: 270 (1937) excluding var. *parviflora*; Curtis, Stud. Fl. Tasmania 3: 560 (1967); Willis, Handb. Pl. Victoria: 604 (1973); Briggs, Carolin & Pulley in Contr. New South Wales Natl. Herb 4: 397 (1973); Rotherham *et al.*, Flowers & Plants New South Wales & Southern Queensland: 88 (1975).—*P. varia* R. Br. var. *debilis* (R. Br.) Maiden et Betche, Census New South Wales Pl.: 186 (1916).—TYPE: Hawkesbury & N [?] Brush, *R. Brown* [1801-3] (BM LECTOTYPE); Port Jackson, *R. Brown* (BM SYNTYPE).

Perennial or sometimes annual; caulorrhiza usually short (1–2 cm) but very rarely stout and up to 12 cm long; taproot usually persistent. *Leaves* all basal and arranged in a rosette, ascending or spreading, narrow-oblanceolate to obovate, 3–15 cm long, 0.8–4 cm wide, pubescent on both surfaces, dentate to almost entire, 3-veined sometimes with a further 2 less prominent veins, obtuse, tapering very gradually into an indistinct petiole with a broadened and somewhat membranous base obscuring the short axillary tuft of pale-brown hairs. *Scapes* (5–) 12–20 (–40) cm long, ascending, pubescent with short antrorse-appressed hairs. *Spikes* loose, (2–) 4–10 cm long in the flowering stage but elongating later, up to 30 cm in the fruiting stage. *Bracts* concave, ovate-elliptic, 1–1.5 mm long, 0.8–1 mm wide, pubescent especially on the thickened carina. *Sepals* subequal, elliptic, 1.5–2.2 (–3.0) mm long, 0.5–1 mm wide, glabrous or pubescent on the narrow green carina which is c. ⅓ of the total width. *Corolla*: tube 1–2 mm long; lobes elliptic to orbicular, 0.8–1 mm long, with a single prominent vein. *Stamens* with filaments up to 3 mm long; anthers 0.5–0.8 mm long, 0.5–0.8 mm wide. *Style* 1.5–2 mm long. *Ovary* bilocular with 2 ovules in one loculus and 3 in the other, the upper one separated from the lower 2 by a swelling of the placenta. *Capsule* ovoid to subglobular, 1.7–3.0 mm long, 1.3–2.5 mm diam., often with the stylar base persistent as a short mucro, the upper section hardened, the lower membranous section c. 0.5 mm long. *Seeds* to 5 in number, yellow to dark brown with a superficial hilum and a thin mucilaginous layer; lower seeds elliptic, biconvex c. 1 mm long; upper seed ± angular and slightly smaller. *Chromosome number*: $2n = 12$. Fl.: throughout the year.

DISTRIBUTION: Widespread on the Coast, Tablelands as well as the North and Central Western Slopes; less common on the Western and Far Western Plains. Mostly in moist forests below 1100 m alt. Also in Queensland (including N. Queensland), Victoria, South Australia, Tasmania and the south of the Northern Territory. Naturalized on Oahu I, Hawaii.

NORTH COAST: Tweed Heads, *Cheel NSW 63447*, 9.1916; lower slope of Mt Lindesay, 7 miles [11 km] ENE. of Woodenbong, *Coveny 4547 & Rodd* 9.1972; Legume, *Briggs 4219*, 5.1971; Edinburgh Castle State Forest, 5 miles [8 km] E. of Urbenville, *Constable 6613*, 12.1965; Yabbra State Forest, SE. of Urbenville, *Hayes, Turner & McGillivray 2582*, 10.1966; Kyogle, *Webb 92*, 10.1944 (CANB), *Coveny 4586 & Rodd* 9.1972; Broadwater, Richmond R, *Cheel NSW 63448*, 9.1916; Clarence R, *Wilcox* 11.1875 (MEL); Grafton Experiment Farm, *Wenholz NSW 63446*, 9.1914; Clouds Creek via South Grafton, *Kirby NSW 63451*, 11.1949; Doyles River State Forest, 30 miles [c. 48 km] NW. of Taree, *Constable 6310*, 11.1965; Little Run Creek, Wherrol Flat, *Coveny 679*, 12.1968; c. 3 miles [5 km] NNE. of Wingham, *Salasoo 2811*, 1.1964; 22 km NNW. of Gloucester on Giro road, *Thurtell & Coveny 3811*, 12.1971. CENTRAL COAST: summit of Mt Kindarun, N. of Putty, *Briggs NSW 89786*, 11.1965; Lake Macquarie, Myuna Bay, *Salasoo 1637*, 12.1958; 1.5 km N. of Gibber Swamp, Windsor-Putty road, *Briggs NSW 89788*, 11.1965; Colo, *Cheel NSW 63343*, 3.1911; Dharug National Park, c. 2 km E. of Wisemans Ferry, *Rodd NSW 121798*, 9.1971; Wisemans Ferry, *Crawford* 9.1963 (SYD); Christies Gully, Mooney Mooney Creek, *Blakely, Darnell-Smith & Shiress NSW 63413*, 9.1926; Patonga Creek, Hawkesbury R, *Blakely & Shiress NSW 63421*, 12.1924; Cowan Creek, 1.6 km E. of Berowra Station, *Rodd 1622*, 3.1971; Kuring-gai Chase near Cowan Creek, *McKee 6653*, 10.1958 (SYD); Newport, *Crawford* 10.1963 (SYD); Bayview, *Cross NSW 63419*, 1941; Bungan Head, *Crawford* 10.1963 (SYD); Mona Vale, *Crawford* 10.1963 (SYD); Warriewood, *Crawford* 10.1963 (SYD), *Briggs 4067 & Carolin* 3.1971, *Briggs NSW 87087*, 9.1968; Narrabeen, *Crawford* 9.1963 (SYD); Hornsby, *Blakely NSW 63420, NSW 63423*, 11.1914; The Valley, Hornsby, *Blakely NSW 63427*, 3.1916; Hornsby, near the Fish Ponds, *Briggs NSW 63405*, 3.1961; Pennant Hills, *Fraser NSW 63426*, 1934; Grose Valley, c. 5 km E. of Blackheath, *Briggs 4491*, 1.1972; Machins Crater, c. 5 miles [8 km] SW. of Glenbrook, *Constable 4771*, 5.1964; Emu Plains, *Aurousseau* 9.1933 or 1934 (SYD); St Marys, *Evans* 12.1925 (SYD); Eastern Creek, *Carolin* 4.1963 (SYD); North Shore [North Sydney], *Betche NSW 63412*, 10.1892; Concord West, *Evans* 1.1927 (SYD); Saleyards, Flemington, *McBarron 15542*, 8.1968, *15641*, *15642*, 9.1968; Burwood, *Davies NSW 63425*, 5.1949; Cooks R, *Hamilton NSW 63424*, 10.1909; Peakhurst, *Cheel NSW 69628*, 5.1899; Penshurst, *Cheel NSW 69629*, 12.1909; Kogarah, *Camfield NSW 136269*, 1896; Kogarah Bay, *Camfield NSW 63408*, 2.1893; East Hills, *Cheel NSW 63409*, 9.1908; Hurstville, *Camfield NSW 63415*, 10.1902; Georges R, Ingleburn, *McBarron 14022*, 3.1967; Minto, *Crawford* 3.1963 (SYD); Woolwash, Campbelltown, *McBarron 7109*, 4.1962; Bola Creek, Royal National Park, *Crawford* 3.1963 (SYD); Bundeena, Port Hacking, *Johnson 956*, 5.1947; Garie Beach, Royal National Park, 14 km SSE. of Sutherland, *Carolin* 4.1957 (SYD), *Crawford* 3.1963 (SYD), *Briggs 4059 & Carolin* 3.1971: Stanwell Park, *Evans* 3.1929 (SYD); Gingra Creek near Kowmung R, *Johnson NSW 63333*, 3.1951; Nepean R, Douglas Park, *Briggs NSW 82395*, 11.1965; Appin, *McBarron 13318*, 10.1966; junction of Jocks Creek and Wollondilly R near Goodmans Ford, 39 km WNW. of Mittagong, alt. 240 m, *Coveny 6075, Hind & Hancock* 3.1975; Thirroul, *Constable NSW 63429*, 5.1957; Mt Kembla, *Hamilton NSW 63437*, 1900; Minnamurra Falls Reserve, 3 miles [5 km] W. of Jamberoo, *Constable NSW 56096*, 2.1959; Saddleback Mtn, Jamberoo, near Kiama, *McBarron 10382*, 1.1965, *Constable NSW 63418*, 1.1955; Beach at Black Head, Gerringong, *Rodway NSW 63472*, 5.1923. SOUTH COAST: Heaps Gully, 3 miles [5 km] SE. of Bungonia Caves, *Constable NSW 63329*, 1.1956; Nowra, *Rodway NSW 63475*, 4.1921; South Crookhaven Head, *Rodway NSW 64371*, 9.1916; Yalwal, *Rodway NSW 64708*, 11.1930; Milton, *Breakwell NSW 63433*, 12.1913; Currowan State Forest, foothills of Budawang range, Batemans Bay district, *Schodde 3501*, 3.1964 (NSW, CANB); Pebbly Beach, *Pulley 740*, 3.1971 (CBG); Tollgate Islands off Batemans Bay, *Warner 7*, 11.1958 (CANB), *Crisp 1992*, 3.1976 (CBG, NSW); Bendethera Caves, 20 miles

[32 km] W. of Moruya, *Constable 6861*, 5.1966; ridge NE. of Nerrigundah, *Constable NSW 26188*, 9.1953; between Cadgee and Dignams Creek, 18 km from Princes Highway, *Johnson 7050*, 4.1971; Belowra, 40 km W. of Narooma, *Briggs 3097*, 12.1969; Montague Island, *Costin NSW 63431*, 11.1959; Mystery Bay, 8 miles [13 km] S. of Narooma, *Seur 84*, 3.1973; 4 km W. of Yowrie, *Johnson 7054*, 4.1971; Bermagui, *Cheel NSW 63434*, 12.1903; 2 km N. of Nungatta [47 km SW. of Eden], *Coveny 5772 & Armstrong* 10.1974; near Jane Spiers Beach, Nadgee Nature Reserve, *McGillivray 3056*, 3.1968. NORTHERN TABLELANDS: Amosfield, S. side of township, *Briggs* 4239, 5.1971; Gwydir Highway, 26 miles [42 km] E. of Glen Innes, *Crawford CBG 002417*, 12.1963 (SYD, CBG); 16 km NE. of Glen Innes on New England Highway, *Briggs 4204*, 5.1971; Glen Innes, *Boorman NSW 63371*, 3.1917, *Wenholz NSW 63367*, 3.1913; SW. Chiswick, Armidale, *Hilder* 11.1947 UNE); Boorolong Creek [20 miles W. of Armidale], *Williams* 10.1971 (UNE); Dangars Falls area, SSE. of Armidale, *Williams* 11.1969 (UNE); 10 miles [16 km] SE. of Nowendoc, *Carolin 2062*, 12.1960 (SYD); Nine Mile Spur, Barrington Tops, *Telford 2769*, 2.1971 (CBG); Mt Allyn, S. of Barrington Tops, *Rodd 1033*, 5.1970. CENTRAL TABLELANDS: Mt Coriaday, *Carolin & Grieve 7096*, 4.1969 (SYD); Turondale, c. 10 km W. of Sofala, *Campbell NSW 122037*, 3.1972; Bathurst, *Peacock* 10.1910 (SYD); Winburndale Creek, Glanmire, *Constable NSW 31301*, 3.1955; Cathedral of Ferns, Mt Wilson, *Conveny 4098 & Bisby* 3.1972; Mt Tomah, *Rodd 1603*, 12.1970, *Coveny 6150 et al.*, 3.1975, *Rodd NSW 94789*, 11.1966; Beauchamp Falls, c. 5 km ESE. of Blackheath, *Carolin* 6.1957 (SYD); Kedumba Valley, c. 5½ miles [9 km] S. of Wentworth Falls, *Constable NSW 47490*, 7.1959; Lowther to Jenolan Caves, *Carolin 874*, 3.1959 (SYD); Little R, 9.8 km NNE. of Jenolan Caves, *Rodd 1607*, 1.1971; Jenolan Ridge, *Crawford* 6.1963 (SYD); Kalang Falls, Kanangra Deep, 10 miles [16 km] SE. of Jenolan Caves, *Constable 5875*, 5.1965; Grove Creek, Abercrombie Caves, *Constable NSW 63338*, 3.1955; Ruby Creek to South Head, Mt Werong, *Johnson & Constable NSW 63340*, 10.1951; Limeburners Clearing, Murruin Creek, 48 km SE. of Oberon, *Pickard 1616 & Campbell* 4.1971; Wombeyan Caves, *Cheel & Cleland NSW 63382*, 12.1919; junction of Jocks Creek and Wollondilly R near Goodmans Ford, 39 km WNW. of Mittagong, alt. 240 m, *Coveny 6075, Hind & Hancock* 3.1975; Fitzroy Falls, *Constable NSW 63330*, 1.1956. SOUTHERN TABLELANDS: Hume Highway, Marulan, *McBarron 5214*, 10.1950; Bungonia Caves, *Carolin 851*, 3.1959 (SYD); Upper Cotter Valley, A.C.T., *Gauba CBG 001448, CBG 001449*, 6.1959 (CBG); Talbingo to Cumberland Range, *Burbidge 3902*, 2.1955; 1 km S. of Big Badja Mtn on main divide, *Johnson 7070*, 4.1971; Brown Mtn, *Carolin B127*, 3.1957 (SYD). NORTH WESTERN SLOPES: Narrabri-Bingara road, 5.5 miles [9 km] from Bingara, *Crawford CBG 002766*, 1.1964 (CBG); 8 miles [13 km] E. of Barraba, *Hay NSW 63441*, 10.1903; Barraba, *Rodway NSW 63469*, 9.1929; 1 mile [1.5 km] W. of Timor Rock, Warrumbungle Mtns, *Briggs 913 & Johnson* 10.1966; between Timor Rock and Timor Dam, *Briggs 6221 & Johnson* 11.1975; 5 km W. of Timor Rock, *Briggs 6212 & Johnson* 11.1975; 7 km W. of Timor Rock, *Briggs 6214 & Johnson* 11.1975; summit of Siding Spring Mtn, *Briggs 6229 & Johnson* 11.1975 (chromosome count voucher, $2n = 12$); S. slope of Siding Spring Mtn, *Briggs 6230, 6231 & Johnson* 11.1975; Camp Pincham Warrumbungle Mtns, *Briggs 6235 & Johnson* 11.1975; Warrumbungle National Park *Dunlop 521*, 8.1969 (CBG); 30 miles [c. 48 km] S. of Tamworth, *Roe 63*, 2.1941 (CANB); foothills of Warrumbungle Range, Yarraman, *Burton* 1.1972 (SYD); 5 km NW. of Quirindi, *Briggs 6205 & Johnson* 11.1975 (chromosome count voucher, $2n = 12$); Razorback Range, 34 miles [55 km] WSW. of Quirindi, *Pickard & Coveny 1120*, 6.1969; below Mt Parry, c. 28 miles [45 km] W. of Murrurundi, *Pickard & Coveny 1107*, 6.1969. CENTRAL WESTERN SLOPES: (all from the Hunter Valley, E. of the Divide): Coulsons Creek, foot of Liverpool Range, N. of Merriwa, *Briggs 2200a*, 9.1968; Belltrees, E. of Scone, *White NSW 63487*, 2.1920; Scone, *Tewksbury NSW 63462*, 10.1949; c. 25 km SW. of Merriwa, N. side of Lees Pinch, *Briggs 3462*, 3.1970; Baerami, *Cambage* 5.1911 (SYD); Coxs Gap, *Carolin 2077*, 12.1960 (SYD). WESTERN PLAINS: 14 km from Brewarrina on Tarcoon road, *Thompson 1119*, 8.1971; c. 25 miles [40 km] SE. of Louth, *Moore 3983*, 9.1966 (CANB); McKeown Tank, 15 km SW. of Coolabah, *Rodd W1857*, 11.1971; 5 miles [8 km] N. of Cobar, *Dumbleton NSW 88901*, 6.1969; Hay, *-NSW 63311, 11.1938.* FAR WESTERN PLAINS: Mootwingee, *Cunningham 1230 & Milthorpe* 9.1973.

This species shows considerable variation throughout its range, probably with ecotypic differentiation. Forms with small and particularly widely-spaced flowers occur in damp conditions such as wet sclerophyll forest and margins of rainforest, whilst some particularly robust forms occur in forests on the South Coast, on the Divide, and (presumably in locally moist sites) on the Western Plains.

In the Warrumbungle Mtns there are particularly large-flowered plants (sepals up to 3 mm long) as well as ones with more typical flower size (sepals <2 mm long). Some sites have uniformly large- or small-flowered plants but others appear to have a mixture of two rather distinct biotypes, sometimes only a few metres apart. It is interesting that large-flowered plants with short scapes and spikes from some exposed sites (summit and upper slopes of Siding Spring Mtn) produced distinctly smaller and more widely spaced flowers, in long spikes borne on long scapes, within only a few weeks after transplantation to lightly shaded conditions in Sydney.

Specimens from Western Australia (*Preiss 1968, 1969*) were referred to this species by Nees in Lehmann, Pl. Preiss, 1: 491 (1845); the former number is referable to *P. exilis* Decaisne but we have not examined the latter number.

P. debilis is probably closest to *P. varia, P. hispida* and *P. exilis* (see p. 28), from which it differs in having smaller and usually more widely spaced flowers or capsules and broader leaves which are thinner in texture than those of *P. varia* and *P. hispida.* It differs from *P. varia* also in the lack of conspicuous, long, red-brown axillary hairs. The sepals of *P. debilis* are usually more distinctly angled at the midvein than in other native species, rather than having a rounded or flattened thickened carina, but this difference may be obscured in the pressing of specimens.

14. Plantago antarctica *Decaisne* in Candolle, Prodr. 13 (1): 703 (1852); J. D. Hooker, Fl. Tasmaniae 1: 302 (1857); Bentham, Fl. Austral. 5: 141 (1870); Pilger in Engler, Pflanzenr. 269, Heft 102: 276 (1937); Curtis, Stud. Fl. Tasmania 3: 562 (1967); Burbidge & Gray, Fl. Austral. Cap. Territory: 334 (1970); Willis, Handb. Pl. Victoria 2: 605 (1973).—Type: Tasmania, *Verreaux* (P Holotype, photo NSW).

Perennial with a short caulorrhiza and a long, thick, persistent taproot. *Leaves* arranged in a rosette, spreading close to the ground, elliptic-obovate to oblanceolate, (3–) 7–10 (–14) cm long, 0.8–2 (–3) cm wide, pubescent on both surfaces, dentate but sometimes obscurely so, 3–5 (–7)-veined with the lateral ones sometimes indistinct, acute, tapering very gradually towards the base, the axil villous with a ± conspicuous tuft of brown hairs. *Scapes* 9–20 cm long, pubescent with antrorse-appressed hairs. *Spikes* cylindrical, 1.5–3 (–7) cm long. *Bracts* concave, ovate, 1.4–1.7 mm long, 1–1.4 mm wide, slightly keeled, with a broad glabrous or ± densely pilose carina ½–⅔ of the total width. *Sepals* subequal, elliptic, obtuse, (2.0–) 2.2–3 mm long, 0.8–1.5 mm wide, glabrous, slightly keeled, membranous towards the margin. *Corolla*: tube 2–2.5 mm long; lobes broad-ovate, 1.3–1.8 mm long, 1.2–1.7 mm wide with a distinct midvein. *Stamens* with filaments 2–3 mm long; anthers 1.3–1.5 mm long, 0.9–1 mm wide. *Style* 2–3 mm long. *Ovary* bilocular with 2 ovules in each loculus, the placenta in one loculus swollen at the apex somewhat more than in the other but without an ovule above it. *Capsule* subglobular to ovoid, 2.5–3.5 (–4) mm long, 1.5–2.5 mm wide, obtuse but with the stylar base often persistent as a short mucro, the lower portion 1–1.5 mm long. *Seeds* 4, elliptic, 1.3–1.8 mm long, 0.7–1 mm wide, often ± irregular in shape, greyish-brown with a superficial hilum and a thin mucilaginous layer. *Chromosome number*: $2n = 12$. Fl.: Dec.-Feb.

Distribution: Southern Tablelands from the Brindabella Range (A.C.T.) and east of Cooma southwards, in montane and lower subalpine grassland as well as in *Eucalyptus pauciflora* ssp. *pauciflora* woodland, mostly 1100–1500 m alt. Also in the cooler parts of Victoria and Tasmania.

Southern Tablelands: Billy Billy Creek above Gibraltar Falls, A.C.T., *Burbidge 7534*, 1.1966 (CANB, NSW); Brindabella Range, on track to summit of Mt Gingera, *Pulley 774, 775*, 4.1971 (CBG); Brindabella Range, below Mt Gingera, *Pulley 766*, 3.1971; Brindabella Range, Snowy Flats below Mt Gingera, *Pulley 756, 758, 761, 762, 764*, 3.1971 (CBG); E. slope of Mt Gingera, Brindabella Range, A.C.T., *Schodde 5164*, 11.1966 (CANB, NSW); 10 km from Orroral Tracking Station on road to Cotter Flats, A.C.T., *Pulley 776, 777, 778, 779*, 4.1971 (CBG); Cotter Flats, A.C.T., *Pulley 793*, 5.1971 (CBG); near Orroral, A.C.T., *Pulley 787*, 5.1971 (CBG); on lower slopes of Mt Bimberi, A.C.T., *Darbyshire 115*, 1.1961 (CANB, NSW, MEL); Naas Creek, c. 60 km S. of Canberra, 0.8 km W. of Boboyan road, A.C.T., *Briggs 4523, 4524, 4526, 4528, Carolin & Pulley* 4.1972; Naas Creek 1.5 km W. of Boboyan road, *Briggs 4524a,* 4.1972; Boboyan, A.C.T., *Gauba CBG 001473,* 12.1954 (CBG); Cave Creek below Blue Waterholes, 11 miles [18 km] NE. of Rules Point, *Rodd 769,* 4.1969; Cave Creek, 18 miles [29 km] NNE. of Kiandra, *Rodd & Coveny 2618,* 12.1969; Rules Point, N. of Kiandra, *Salasoo 3485,* 1.1969; Kiandra, *Briggs 2525,* 2.1969, *4377,* 10.1971; Kiandra district, *Bryant NSW 121630,* 12.1964; Rocky Plains Creek valley, SE. of Kiandra on Snowy Mtns Highway, *Briggs 4375,* 10.1971; Happy Jacks Plain, *Phillips CBG 003142,* 1.1964 (CBG), *Thompson NSW 63402, 63403,* 1.1958, *Eichler 19040,* 2.1967; Barneys Creek, headwaters of the Happy Jacks R, c. 16 miles [26 km] S. of Kiandra, *Thompson NSW 63401,* 1.1958; 6 km (direct line) NE. of Cabramurra on road to Kiandra, *Briggs 4379,* 10.1971; near Cabramurra, *Moore 3259, 3266,* 1.1961 (CANB); Upper Tumut region, *Newman NSW 63388,* 12.1952; Kybean R, *Cambage 2125,* 11.1908 (NSW, SYD); Jindabyne, *Maiden & Forsyth NSW 63399,* 1.1899; Kosciusko [district], *McLuckie & Petrie* 1.1924 or 1925 (SYD).

In the valleys to the east of the Brindabella Range (A.C.T.) *P. antarctica* occurs with *P. varia.* The features of some plants, particularly in moist sites, suggest the possibility of hybridization. Such collections have been made at Naas Creek, c. 60 km S. of Canberra, 0.8–1.6 km W. of Boboyan road, A.C.T., *Briggs 4523a, 4528a, 4527, Carolin & Pulley* 4.1972. Chromosome counts have been made on 8 plants from Naas Creek (Briggs in Contrib. N.S.W. Natl. Herb. 4: 399–405, 1973), 4 referable to *P. antarctica* and 4 identified as glabrous or subglabrous plants of *P. varia,* but no departures were found from the chromosome numbers $2n = 12$ and $2n = 24$ respectively, as general in these species. The situation clearly requires further study.

P. antarctica is distinguished from *P. euryphylla* by its persistent tap-root and larger flowers (particularly the larger anthers) and from *P. varia* by its broader and usually more spreading leaves and its glabrous obtuse sepals.

15. Plantago hispida *R. Br.,* Prodr.: 425 (1810); Decaisne in Candolle, Prodr. 13 (1): 701 (1852); Pilger in Engler, Pflanzenr. 269, Heft 102: 268 (1937), Briggs, Carolin & Pulley in Contrib. New South Wales Natl. Herb. 4: 397 (1973).—TYPE: Ad littor. arenos: ma . . . [?] Port Dalrymple [Tasmania], *R. Brown* (BM LECTOTYPE, photo NSW), uppermost specimen on sheet; ad litt. Derwent [Tasmania], *R. Brown* (BM SYNTYPE), mounted on same sheet as lectotype.

P. tildeniae Pilger in Fedde Repert. 20: 13 (1924); Pilger in Engler, Pflanzenr. 269, Heft 102: 265 (1937); Beadle, Evans & Carolin, Fl. Sydney Reg. 433 (1972).—TYPE: [Kiama,] *Josephine Tilden 599,* [Sept. 1912] (NSW 63488, K ISOTYPES). The specimen in NSW is dated April 1913, which is presumably the date of receipt at NSW. The holotype in B is no longer extant.

P. varia R. Br. f. *glabra* Pilger in Pflanzenr. 269, Heft 102: 269 (1937); Briggs, Carolin & Pulley in Contrib. New South Wales Natl. Herb. 4: 398 (1973).—TYPE: [Botany Bay] New Holland, *Banks & Solander* 1770 (BM, NSW 121559 ISOLECTOTYPES). The holotype in B is no longer extant.

Perennial with a short caulorrhiza and a persistent, often stout, taproot. *Leaves* all basal and arranged in a rosette, ascending or spreading, oblanceolate to narrow-oblong, (2–) 4–9 (–16) cm long, (0.3–) 4–1.2 cm wide, usually pubescent on both surfaces but occasionally glabrous in the coastal forms, often glossy, sometimes thick, dentate but sometimes obscurely so, obtuse, tapering very gradually into a very indistinct petiole with a broadened base obscuring the short tuft of white or slightly tawny axillary hairs. *Scapes* 3–30 cm long, pubescent with stiff spreading or antrorse hairs. *Spikes* 1–6 (–10) cm long. *Bracts* concave, ovate, 1–1.8 mm long, 0.8–1 mm wide, pubescent on the thickened carina which is c. ½ of the total width. *Sepals* subequal, oblong-elliptic, 2.2–2.8 (–3.0) mm long, 1–1.5 mm wide, slightly keeled, pubescent on the carina which is

¼–½ of the total width, membranous towards the margin, obtuse. *Corolla*: tube 1.5–2.5 mm long; lobes orbicular, 1.3–1.5 mm diam., slightly acuminate with a single prominent vein. *Stamens* with filaments c. 2 mm long; anthers 1–1.3 mm long, 0.4–0.6 mm wide. *Style* 2–3 mm long. *Ovary* bilocular; one loculus with 2 ovules, the other with 3 ovules and the apical one separated from the lower 2 by swelling of the placenta. *Capsule* ovoid, 2.8–3.5 mm long, 1.7–2.0 (–2.5) mm diam., obtuse but with the stylar base persistent as a short mucro, the upper portion hardened, the lower membranous portion c. 0.5 mm long. *Seeds* up to 5 in number, elliptic, 1–1.5 mm long, 0.8–1 mm wide, brown with a superficial hilum and a thin mucilaginous layer. *Chromosome number*: $2n = 12$.

DISTRIBUTION: Coast, Tablelands and rare on the Western Slopes, usually on shallow soil in crevices of rock exposures but not on sandstones except near the sea. Most common in sea-shore situations but found up to 1800 m alt. on the Southern Tablelands. Also in Victoria, Tasmania, South Australia and Western Australia; to be expected in the Wallangarra district of southeast Queensland.

NORTH COAST: Port Stephens, *Boorman NSW 63450* 9.1911; Birubi Point near Anna Bay, Port Stephens district, *Wilson 1322*, 7.1975. CENTRAL COAST: Long Reef near Narrabeen, *Crawford* 4.1963, 9.1963 (SYD), *Briggs NSW 87085, NSW 87086*, 11.1968, *Briggs 4065, 4066 & Carolin* 3.1971; Bondi, *Rogerson* 1.1935 (SYD); Rockdale, *Andrews NSW 63406*, –; Cronulla, *Hamilton NSW 63414*, 12.1916; Jibbon Head, NE. of Bundeena, *Briggs 4684*, 9.1972; Bundeena, *Carolin 1074*, 9.1959 (SYD); Marley Beach, *Hamilton NSW* 63407, 4.1916; Garie Beach, c. 8 km E. of Waterfall, *Crawford* 3.1963 (SYD), *Briggs 4058 & Carolin* 3.1971, *Coveny 3666*, 10.1971; Garie Beach South, *Carolin 442*, 3.1958 (SYD); Stanwell Park, *Evans* 3.1929 (SYD); Five Islands (off Pt. Kembla), *Day* 10.1936 (CANB); Windang Island, entrance to Lake Illawarra, *Burton NSW 121631*, 3.1971; Barrack Point, N. of Shellharbour, *Briggs 4057 & Carolin* 3.1971; Shellharbour, *Cheel NSW 63435*, 10.1899; Bass Point, 4 km SE. of Shellharbour, *Briggs 4056 & Carolin* 3.1971; Kiama, *Camfield NSW 63436*, 12.1899, *Briggs 4054, 4055 & Carolin* 3.1971. SOUTH COAST: South Crookhaven Head, *Rodway NSW 64710*, 1.1941; Currarong, *Rodway NSW 63470*, 4.1936; Jervis Bay, *Maiden NSW 63432*, 7.1899; Brush Island (SE. of Termeil), *Rodway 2270*, 9.1936, *NSW 63473*, 9.1937; Tollgate Is, Batemans Bay, *Crisp 1992a*, 3.1976; South Tollgate I, *Rodway NSW 64715*, 1.1924; Tathra Beach, 11 miles [18 km] E. of Bega, *Seur 66*, 3.1973; Twofold Bay, - 9.1860 (MEL 42521). NORTHERN TABLELANDS: Base of Bald Rock Mtn, 15 miles [25 km] N. of Tenterfield, *Constable 2076*, 3.1962; Coryah Gap to Mt Kaputar, Nandewar Ranges, *Johnson & Constable NSW 63372*, 11.1954. CENTRAL TABLELANDS: Lookout Rock, Mullions Range State Forest, 16 miles [36 km] N. of Orange, *Constable NSW 48899*, 11.1959; Boschs Creek at Lookout Rock, *Briggs 6241 & Johnson* 11.1975 (chromosome count voucher, $2n = 12$); Lithgow, *Betche* 9.1881 (MEL 44277); Megalong Valley, *Carolin 555*, 11.1958 (SYD); Boyd Plateau, Boyd R Crossing, *Black* 11.1972 (SYD); Boyd Plateau, near Belarah Swamp, *Black* 11.1972 (SYD); Abercrombie Caves, *Constable NSW 63339*, 3.1955; Wingello, *Boorman NSW 63396*, 12.1913. SOUTHERN TABLELANDS: 11 km SW. of Captains Flat, *Coveny 5744 & Armstrong* 10.1974; Mt Coree, Brindabella Range, *Telford 3072*, 2.1972 (CBG); Mt Gingera, Brindabella Range, *Telford 2874*, 6.1971, *Telford 3076*, 2.1972 (CBG); 0.7 km S. of Gudgenby at Glendale Crossing, Gudgenby R, *Pulley 1019*, 3.1972 (CBG); Blue Waterholes, Cave Creek (11 miles [18 km] NE. of Rules Point), *Rodd 791*, 4.1969, *Rodd 922 & Coveny* 12.1969; Cooma, *Boorman NSW 63397*, 12.1913. CENTRAL WESTERN SLOPES: E. slope of Mt Arthur, c. 2 km W. of Wellington, *Briggs 6238 & Johnson* 11.1975 (chromosome count voucher, $2n = 12$); Temora, *Elliott NSW 63455*, 10.1912. SOUTH WESTERN SLOPES: Gilmore near Tumut, *Boorman NSW 63384*, 10.1916.

Bentham, Fl. Austral. 5: 140 (1870) included *P. hispida* under *P. varia*.

Coastal forms of this species often have less pubescent leaves (sometimes quite glabrous) and somewhat larger flowers than inland forms. Differences in pubescence are seen in some coastal sites between plants only a few metres apart, with the more glabrous plants mostly in the more exposed situations.

P. hispida is probably closest to *P. varia* from which it differs in the inconspicuous axillary tuft of white or slightly tawny hairs. In addition it generally, but not invariably, has a shorter taproot, more numerous leaves and scapes, narrower leaves (except in some sea-coast specimens), shorter spikes, more spreading flowers and more spreading hairs on scapes and petioles. The bracts of the lowest flowers of the spike are mostly shorter than the sepals whereas those of *P. varia* may be either longer or shorter than the sepals.

16. Plantago varia *R. Br.*, Prodr.: 425 (1810); Briggs, Carolin & Pulley, Contr. New South Wales Natl. Herb. 4: 397 (1973); for further references see below.—TYPE: prope fl. Derwent [Tasmania], *R. Brown* Mai 1804 (BM LECTOTYPE, photo NSW), upper left specimen on sheet, originally labelled *"Plantago polymorpha"*.

PROBABLE SYNONYM: *P. struthionis* A. Cunn. ex Decaisne in Candolle, Prodr. 13 (1): 702 (1852); Pilger in Engler, Pflanzenr. 269, Heft 102: 266 (1937).—TYPE: Marley's Plain [= Foxlow, 20 km SE. of Queanbeyan], *A. Cunningham 32*, 1824 (K HOLOTYPE).

Perennial with a thick caulorrhiza and a strong persistent taproot. *Leaves* all basal, arranged in a rosette, ascending to erect, oblong-oblanceolate, (4–) 6–20 cm long, (0.8–) 1–2 cm wide, pubescent on both surfaces, usually dentate with conspicuous deltoid and often retrorse teeth, obtuse to acute, 3–5-veined, tapering very gradually towards the broadened base and with a conspicuous tuft of reddish brown hairs in the axil. *Scapes* (5–) 8–20 (–25) cm long, pubescent with ± antrorse hairs. *Spikes* 3–11 cm long. *Bracts* concave, ovate, 2.8–3.5 mm long, (1.5–) 1.8–2.5 mm wide, at least the lower ones as long as the sepals or nearly so, with a pubescent and very slightly angled carina ½–⅔ of the total width. *Sepals* subequal, elliptic to broad-elliptic, 2.8–3.5 (–4.0) mm long, 1.5–2.5 mm wide, ciliate on the margin with a pubescent and scarcely-angled carina ¼–½ of the total width. *Corolla*: tube 2–2.5 mm long; lobes ovate, 1.5–2.3 mm long, 1–1.8 mm wide, acuminate. *Stamens* with filaments 4–5 mm long; anthers 1.6–2 mm long, 1–1.3 mm wide. *Style* 3–3.8 mm long. *Ovary* bilocular with 2 ovules in one loculus and 3 in the other, the uppermost ovule separated from the lower ones by a swelling of the placenta. *Capsule* ovoid-globular, 3–3.6 (–4.0) mm long, 1.5–2 (–2.4) mm wide, acuminate-mucronate with the persistent stylar base, the upper portion hardened, the lower persistent membranous portion 1–1.4 mm wide. *Seeds* up to 5 in number, oblong-elliptic, 1.5–1.8 mm long, 1–1.1 mm wide, brown, with a large superficial hilum and a thin mucilaginous layer. *Chromosome number*: $2n = 24$, also $2n = 12$ reported in Tasmania. Fl.: mostly Aug.-Feb.

DISTRIBUTION: Widespread on the Tablelands and Western Slopes in the southern half of New South Wales, also occasional on the western edge of the Central and South Coast, on the Northern Tablelands, and a single record from the south of the Western Plains. In grassland as well as *Eucalyptus* forest and woodland. Also in Victoria, Tasmania and South Australia.

CENTRAL COAST: Hawkesbury Agricultural College, Richmond, - *NSW 63483*, 10.1906; Burragorang Valley, *Crawford* 3.1963 (SYD); Yerranderie, *Boorman NSW 63334*, 8.1916. SOUTH COAST: Bondi State Forest, 1.3 km W. of the Nungatta turnoff [42 km WSW. of Eden on the Rockton-Towamba road], *Coveny 5769 & Armstrong* 10.1974. NORTHERN TABLELANDS: Armidale, *Wescombe CBG 012369*, 4.1963 (CBG); *Winterhalder* 10.1959 (UNE). NORTH WESTERN SLOPES ?: Narrabri [district], *Breakwell NSW 63308*, 10.1912. CENTRAL TABLELANDS: 3 km S. of Ilford on Mt Vincent road, *Briggs 3471*, 3.1970; Boschs Creek, Lookout Rock, Mullion Range State Forest, E. of Mullion Creek, *Briggs 6242 & Johnson* 11.1975 (chromosome count voucher, $2n = 24$); 3 km W. of Lookout Rock, *Briggs 6240 & Johnson* 11.1975; 14 miles [23 km] NNE. of Orange, *Coveny 4155*, 4.1972; Neville district (near Blayney), *Madsen NSW 63344*, 12.1950; S. side of South Bowenfels, *Briggs 6248 & Johnson* 11.1975; Lett R at Jenolan turn-off [1 km NW. of Hartley], *Carolin 865*, 3.1959 (SYD); *Johnson 8239 & Briggs* 11.1975; Megalong Valley, *Carolin 555*, 10.1958 (SYD); Katoomba, *Hamilton NSW 63336*, 12.1902; Jenolan Caves, *Blakely NSW 63335*, 9.1899; Kowmung, R. 1 km below Tuglow Caves, alt. 950 m, *Rodd 2289*, 11.1972; The Peaks, Yerranderie, *Cambage 1274*, 8.1905 (NSW, SYD); Bindook Swamp, c. 12 km SW. of Yerranderie, *Johnson & Briggs 1075*, 11.1966; N. slope of Mt Gibraltar, *Thompson 160*, 11.1969; Mittagong, *Dixon NSW 63342*, 2.1918; Bowral, *Cambage 1464*, 2.1906 (SYD), *Rodway NSW 64709*, 10.1920. SOUTHERN TABLELANDS: Goulburn, *Dwyer CBG 019193*, (CBG); Bungonia Lookdown, 11 km NE. of Bungonia, *Constable NSW 63331*, 1.1956, *Johnson 8051a*, 3.1975; 17 miles [27 km] from Uriarra on Yass road, *Moore 1848*, 10.1952 (CANB); ESE. of Murrumbateman on road to Gunning-Queanbeyan road, *De Nardi 493*, 11.1970; near Dingo

Dell Flats, Baldy Range, A.C.T., *Schodde 1197,* 12.1960 (CANB, NSW); Kowen Forest, 8 miles [13 km] E. of Canberra, A.C.T., *Evans 2580,* 12.1966 (CANB, NSW); Canberra, *Tillyard* 11.1933 (SYD), *McKee 9663,* 11.1962; Cook, [Canberra suburb], *Pulley 770,* 3.1971 (CBG); Black Mtn, Canberra, *Hartley 0083,* 7.1948 (CANB, NSW), *McDonnell 156,* 11.1969 (CBG); Cotter Dam, A.C.T., *Rodway NSW 63477,* 10.1936; bottom of Mt Franklin road, A.C.T., *Crawford CBG 008485,* 12.1964 (CBG, NSW, SYD); 4 km from Queanbeyan, on Queanbeyan-Sutton road, *Pulley 804,* 5.1971 (CBG); Tuggeranong, A.C.T., *Beeton & Burgess CBG 001480,* 1.1962 (CBG); 2 km NW. of Foxlow, *Thompson 1021,* 1.1971; Tharwa, SSW. of Canberra, A.C.T., *Briggs 4520,* 4.1971, *Pulley 784,* 1.1971 (CBG); Wog Wog Creek, Budawang Range, *Telford 3077, 3078, 3079,* 3.1972; Braidwood, *Evans* 9.1926 (SYD); 1.6 km from Orroral towards Naas, A.C.T., *Pulley 786,* 5.1971 (CBG); Shanahans Hill, Boboyan road c. 55 km S. of Canberra, A.C.T., *Briggs 4522, Carolin & Pulley* 4.1972; Naas Creek, A.C.T., 0.8 km N. of Boboyan road, *Pulley 1024,* 3.1972 (CBG); Naas Creek, 1.6 km W. of Boboyan road, *Briggs 4525, Carolin & Pulley* 4.1972; Naas Creek, 46 miles [74 km] by road from Canberra on Adaminaby road, *Briggs 4526,* 4.1972; Tinderry Mtns, alt. 4000 ft [1200 m], *Moore 3350,* 1.1961 (CANB); Cave Creek, 0.4 km below the Blue Waterholes, 18 km NE. of Rules Point, *Rodd 922 & Coveny* 12.1969; 5 km S. of Gudgenby R, A.C.T., *Pulley 1031,* 3.1972 (CBG); 7 km S. of Gudgenby, A.C.T. at Glendale Crossing, *Pulley 1018,* 3.1972; Hospital Creek, S. of Gudgenby, A.C.T., *Pulley 1028,* 3.1972 (CBG); Hospital Creek, at Gudgenby road, A.C.T., *Pulley 1025 & Telford,* 3.1972 (CBG); Yarrangobilly, *Carolin B87,* 2.1957 (SYD); Kiandra to Adaminaby, *Carolin B102,* 2.1957 (SYD); 3 km NW. of Dry Plain, c. 25 km NW. of Cooma, *Briggs* 4051, 2.1971; Dry Plains near Adaminaby, *Carolin* 2.1971 (SYD); Tooma, *Boorman NSW 63398,* 10.1916; Mt Jagungal, ½ mile (0.8 km) S. of summit, *Rodd 745,* 12.1968; c. 8 km W. of Countegany on road to Numeralla, *Briggs & Rodd 1579,* 12.1970; 3 miles [5 km] S. of Cooma on Bobundara road, *Beeton CBG 022144,* 3.1962; Sawpit Creek near Jindabyne, *Carolin B119,* 3.1957 (SYD); Kydra Reefs fire trail, *Tindale 4021A, Parris & Wimbush* 1.1975; Kydra Creek on the Nimmitabel-Countegany road [18 km NE. of Nimmitabel], *Coveny 6215, Hind & Hancock* 3.1975; near McLaughlin R, SE. of Nimmitabel, *Salasoo 2064* 1.1961. Central Western Slopes: Cobbora, *Smith NSW 63459,* 2.1939, *Garden NSW 63454,* 10.1949; Narromine, *Maiden NSW 63457,* 9.1898; Gulgong, Cudgegong R, *Barnard 55* (MEL); Dripstone, *Althofer NSW 63458,* 8.1948; Burrendong Dam Arboretum, *Phillips 137,* 9.1966 (CBG); Cowra, *Beattie NSW 63456,* 9.1915; Broula, 16 km SW. of Cowra, *McBarron 21011,* 9.1973; 6.4 km SW. of Tallimba, c. 32 km from West Wyalong, *Sikkes 503 & Telford* 10.1972 (CBG); 13 miles [21 km] from Temora towards Wyalong, *Wrigley 198,* 12.1971 (CBG). South Western Slopes: Junee, *Dwyer 594,* 9.1915; Tumut, *Maiden & Boorman NSW 63385,* 8.1903; Culcairn, *McBarron NSW 63466,* 8.1949 (NSW, SYD), *Flynn NSW 122082, Pulley & Telford 772,* 4.1971 (CBG); Monument Hill, Albury, *McBarron 3770,* -. Western Plains: Hay distr., *Officer NSW 63485,* 9.1903.

Most authors have used the name *P. varia* in an extremely imprecise manner. It appears to have been applied in approximately the original sense by Decaisne in Candolle, Prodr. 13 (1): 701 (1852); Pilger in Engler, Pflanzenr. 269, Heft 102: 269 (1937) excluding f. *glabra,* var. *exigua*[†] and part of the synonymy; Curtis, Stud. Fl. Tasmania 3: 561 (1967) excluding some synonyms; and probably by J. D. Hooker, Fl. Tasmaniae 1: 302 (1857). It was applied broadly to include several or many of the species by Bentham, Fl. Austral. 5: 139 (1870); Moore & Betche, Handb. Fl. New South Wales: 314 (1893); F. M. Bailey, Queensland Fl. 4: 1210 (1901); F. M. Bailey, Compr. Cat. Queensland Pl.: 395, 396 (1912); Maiden & Betche, Census New South Wales Pl.: 186 (1916); Gardner, Enum. Pl. Austral. Occ.: 121 (1930); Ewart, Fl. Victoria: 1038 (1931); Black, Fl. South Australia, ed. 2, 4: 792 (1957); Burbidge & Gray, Fl. Austral. Cap. Territory: 334 (1970); Beadle, Evans & Carolin, Fl. Sydney Reg.: 433 (1972); Willis, Handb. Fl. Victoria 2: 605 (1973).

Leigh & Mulham, Pastoral Plants of the Riverine Plain: 108 (1965) apply the name to *P. cunninghamii* and/or *P. drummondii.* Bentham (1870) and Eichler, Suppl. Black's Fl. South Australia: 287 (1965) drew attention to the inclusion of several diverse forms or distinct species under *P. varia.*

[†] *P. varia* var. *exigua* Pilger in Engler, Pflanzenr. 269, Heft 102: 269 (1937) is a taxon comprising diminutive Western Australian annuals with very slender taproot, pubescent carinas of the sepals, very small anthers and pale almost globular capsules. It appears specifically distinct but the name *P. exigua* is preoccupied and a new name will be published elsewhere.

Hurst, Poison Plants of New South Wales: 391 (1942) comments that "*P. varia*" forms "a succulent and appetising part of the herbage" in some areas but also cases of stock poisoning have been attributed to it; however, these comments may refer to any of several species. Similarly Whittet, Weeds, ed. 2: 404 (1968) bases his comments at least in part on the annual native species which would be more important fodder plants than *P. varia.*

Nees in Lehmann, Pl. Preiss. i. 490 (1845) applied this name to a collection (*Preiss 1970*) of *P. exilis* Decaisne†.

In central and western Victoria and southeastern South Australia there is extensive intergradation with *P. gaudichaudii*. *P. varia* appears to intergrade with *P. antarctica* in moist valleys of the Southern Tablelands (see under *P. antarctica*) but the species show chromosome numbers of $2n = 24$ and $2n = 12$ respectively. The apparent morphological intermediates may not be of hybrid origin and the situation needs more study. *P. varia* typically occurs in native grasslands, woodlands, forests and has pilose leaves and long inflorescences. Another form, with almost glabrous leaves and shorter inflorescences, occurs in damp grasslands of the Central and Southern Tablelands (e.g. Bindook Swamp and Naas); there appear to be intermediates between these and the more pubescent forms. The Holotype of *P. struthionis* is such a glabrous-leaved plant.

Curtis, Stud. Fl. Tasmania 3: 561 (1967) reports chromosome numbers of $2n = 12$ and $2n = 24$, but only the latter number has been found in New South Wales material.

P. varia is distinctive in its combination of reddish-brown axillary hairs, dense spikes, pilose sepals and narrow-elliptic (but not linear) leaves. However, it is sometimes difficult to separate this taxon from *P. gaudichaudii, P. hispida* and *P. antarctica.*

17. Plantago gaudichaudii *Barnéoud,* Monogr. Plantag.: 15 (1845); Decaisne in Candolle, Prodr. 13 (1): 702 (1852); Pilger in Engler, Pflanzenr. 269, Heft 102: 270 (1937); Beadle, Evans & Carolin, Fl. Sydney Reg.: 433 (1972).—TYPE: Port Jackson, *Gaudichaud* (P HOLOTYPE, photo NSW).

P. sericophylla Decaisne in Candolle, Prodr. 13 (1): 702 (1852); Pilger in Engler, Pflanzenr. 269, Heft 102: 265 (1937).—TYPE: In Novae Holl. graminosis region. inter. N.S. Wales, *A. Cunningham* (P HOLOTYPE, not examined). PROBABLE ISOTYPES: Plantago 27 July (Herb. Hookerianum) (K) and near Lachlan River, *A. Cunningham 49,* 1817 (BM); these have been examined by L. Pedley and comparison made with *Maiden & Boorman NSW 63454.*

P. bakeri Pilger in Feddes Repert. Spec. Nov. Regni Veg. 20: 14 (1924); Pilger in Engler, Pflanzenr. 269, Heft 102: 266 (1937).—TYPE: Murrumbo, N. of Rylstone, near Goulburn R, *R. T. Baker,* 10.1893 (B HOLOTYPE, no longer extant); subtropical New Holland, *Lieut.-Col. Sir Th. Mitchell* (K PARATYPE) (annotated by Pilger as *Plantago bakeri,* examined by L. Pedley and L. Johnson, comparison made with *Maiden & Boorman NSW 63453*). The place of collection of the paratype is not known; most of Mitchell's route was further west than the known range of *P. gaudichaudii* in this region.

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† *P. exilis* Decaisne in Candolle, Prodr. 13 (1): 702 (1852), somewhat resembles *P. hispida* but has longer and stouter hairs on the leaves, larger flowers and sharper sepal keels. Hairs on the petioles, laminae and lower half of the scapes are patent but appressed on the upper scape. Laminae linear-oblanceolate with a few spreading teeth, tapering gradually into the slender petiole. Axillary hairs light brown and inconspicuous. Sepals with the carina pubescent. Syntypes (P, photos NSW). Considered to be specifically distinct, native to the southwest of W.A.

Perennial with a long, thick, fleshy taproot, the secondary roots thick and sometimes giving rise to new plants, the short thick caulorrhiza covered with dead leaf-bases and axillary hairs. *Leaves* all basal, ± erect to arcuate-ascending, linear to linear-lanceolate or linear-elliptic, (5–) 7–20 (–33) cm long, 0.2–0.8 (–1.4) cm wide, thick and brittle, imperceptibly narrowing into the petiole, glabrous to sericeous or with very short stiff spreading hairs, ± entire or with several, distant, obtuse teeth with tufts of fine hairs on their adaxial surface, the broadened scarious base partially covering an axillary tuft of long red-brown or golden-brown hairs. *Scapes* up to 5–14 in number, pubescent to sericeous, as long as the leaves or longer in the flowering stage. *Spikes* cylindrical, (1.5–) 4–12 (–20) cm long, initially dense but becoming lax at maturity. *Bracts* ovate, (1.5–) 2–4.5 mm long, 1–2 mm wide, ciliate at the margin, with a glabrous fleshy carina ⅓–½ of the total width. *Sepals* elliptic, subequal, 2.8–3.5 mm long, 1–2 mm wide, the margins slightly ciliate with a glabrous to sericeous carina ⅓ the total width. *Corolla*: tube 2–3 (–4) mm long; lobes ovate 1.4–2 (–2.5) mm long, 1–1.5 (–2) mm wide, membranous with a slight purplish tinge at the base. *Stamens* with filaments 4–6 mm long; anthers 2–2.5 mm long, 1–1.5 mm wide, purplish. *Style* white, to 6 mm long. *Ovary* bilocular, one loculus with 2 ovules, the other with three but the uppermost ovule separated by a swelling of the placenta. *Capsule* ellipsoid, (2.4–) 2.8–4 (–5) mm long, (1.2–) 1.5–2.6 mm diam., the apex acute or with a minute mucro, the upper portion hardened, the lower portion c. 1.5 mm long. *Seeds* 1–5 in number, light brown; the lower four elliptic, 2.2 mm long, 1 mm wide; the upper one smaller, angular, 1.4 mm long, 1 mm wide. *Chromosome number*: $2n = 12, 24, 36$. Fl.: Sept.-April.

DISTRIBUTION: Central Coast (mainly in the western part of the Sydney coastal plain), the adjoining edge of the North Coast and northern edge of the South Coast, Tablelands (up to c. 800 m alt.), Central and South Western slopes and the southern parts of the Western Plains. In grassland, *Eucalyptus* forest or woodland, on rocky sites or soils of very heavy texture (sometimes on small pockets of clay in regions of predominantly sandy soils). Also the extreme southeast of Queensland (Stanthorpe district), Victoria, South Australia and Tasmania. Further collecting may show the distribution of this species to be more extensive and more continuous.

NORTH COAST: 8 km N. of Broke [13 km SSW. of Singleton] alt. 75 m, *Coveny 5874, Hind & Hancock* 11.1974. CENTRAL COAST: Marayong, *Hind 766,* 11.1972; Doonside c. 6.8 km W. of Blacktown, *Coveny 639,* 12.1968; Rooty Hill, *Crawford* 3.1963 (SYD); Wentworthville, *Tupper* c. 1933 (SYD); Bringelly road-Chain of Ponds roads intersection, Penrith, *Campbell NSW 136263,* 11.1974; Concord, *Evans* 9.1932 (SYD); Port Jackson, *Brown* (BM, originally labelled "*Plantago polymorpha*", a SYNTYPE of *P. varia*); Millers Creek near Liverpool, *Crawford* 3.1963 (SYD); 3 km SW. of Casula, *Coveny 5356,* 11.1973; East Hills, *Cheel NSW 63416,* 9.1908; Denham Court near Ingleburn, *McBarron 14013,* 3.1967; 13 km SW. of Liverpool on Hume Highway, *Briggs 4062,* 3.1971; Railway line, Minto, *McBarron* 14890, 2.1968; Bringelly, *Toth NSW 136262,* 2.1974; Camden, *McBarron 11130,* 9.1965. SOUTH COAST: Huskisson, S. side of town, *Briggs 4466,* 10.1971. NORTHERN TABLELANDS: 1 km E. of border gate on Stanthorpe-Amosfield road, *Briggs 4238,* 5.1971; Glen Elgin, *Haney,* 2.1930 (MEL); southern end of Pheasant Mtn, 1 mile [1.5 km] E. of Backwater by road, *McGillivray & Coveny 3613,* 4.1971; Mt Kaputar, Nandewar Range, near Narrabri, *Crawford CBG 002419,* 1.1964 (CBG, NSW, SYD); Coryah Gap, Nandewar Range, alt. 1155 m, *Johnson & Constable NSW 63439,* 11.1954, *Briggs 4295,* 6.1971; Ebor to Guyra, *Carolin 431,* 11.1957 (SYD); Ebor Falls, near top of Falls, *Briggs 3450,* 3.1970; Blue Hole, gorge of Gara R, Armidale, *St. John 24488,* 12.1950; Armidale, *Perrott 18,* - (MEL), *Davis NSW 63479,* 9.1939, *Carolin 0769,* 1.1959 (SYD); 2 miles [3 km] N. of Kirby Research Station, c. 4 miles [6 km] SW. of Armidale, *Coveny 2287,* 10.1969; Wollomombi Falls Lookout, *Johnson 7880,* 1.1975; Uralla Cemetery, *Johnson 7883,* 1.1975; Apsley Falls, E. of Walcha, *Telford 2724,* 12.1970 (CBG). CENTRAL TABLELANDS: 3.5 miles [5.5 km] from Ben Bullen on Lithgow road, *Wilson 693,* 11.1974; Moss Vale, *Cheel NSW 63341,* 4.1910. SOUTHERN TABLELANDS: Goulburn, *Dwyer NSW 63391,* 2.1915; between Bungendore and Tarago, 7.5 miles [c. 12 km] from Bungendore, *Moore 1691,* 7.1952 (CANB); Duntroon, Canberra, A.C.T., *Gray 6256,* 11.1968 (CANB); 18 km NW. of Braidwood on road to Doughboy, near Mayfield turnoff, *Briggs 4363 & Johnson* 10.1971; 9 miles [15 km] NNW. of Braidwood, *Adams* 1980, 11.1967; Tharwa, A.C.T., *Cambage 2998,* 11.1911 (SYD), *Kirchner 43,* 10.1950, *Pulley 785 & Telford,* 4.1971 (CBG); 1 km S. of Tharwa bridge, on Boboyan road, A.C.T., *Briggs 4499, Carolin & Pulley* 4.1972; c. 10 km N. of Captains Flat, *De Nardi 503,* 11.1970; 11 km SW. of Captains Flat, *Coveny 5744a & Armstrong* 10.1974; Michelago, *Boorman NSW 63390,* 1.1909. CENTRAL WESTERN SLOPES: Gulgong, *Maiden & Boorman NSW 63453,* 4.1901. *Barnard 197,* - (MEL); Koorawatha (Cowra-Young road), *McBarron 20989,* 9.1973. SOUTH WESTERN SLOPES: 5 miles [8 km] S. of Culcairn, *Flynn NSW 136264,* 9.1962, *NSW 69608,* 1972; Table Top, *McBarron 3156,* 3.1949. WESTERN PLAINS. Hay distr., *Officer NSW 63485,* 9.1903; "Zara", Wanganella, *Officer NSW 66312, NSW 66313,* 10.1915.

The type of *P. intermedia* Steud. in Flora 32: 414 (1849) (non *P. intermedia* Gilib. 1806) has not been examined and its source within Australia is not known. From the description this name appears probably to refer to material of *P. gaudichaudii. P. hispida* R. Br. var. *denudata* Steud. in Flora 32: 415 (1849) was proposed as an alternative name based on the same type as *P. intermedia.*

A specimen of *P. gaudichaudii,* or intergrade of this species and *P. varia,* was cited as a paratype of *P. acutiloba* Pilger in Repert. Spec. Nov. Regni. Veg. 20: 13 (1924). This collection, Paddocks at Doncaster [Victoria], *Toepffer 16,* 22.8.1886 (MEL 42247 isosyntype) has the leaves pilose with short spreading hairs. The holotype, from Tasmania, is no longer extant and its identity has not been determined, but it is probably not conspecific with any of the mainland species which have been described more recently.

Plants with glabrous leaves (which are often very narrow but are thick and fleshy) are most common in New South Wales on heavy clay soils at relatively low elevations but also occur at c. 800 m alt. in the extreme north of the Northern Tablelands. Leaves with long sericeous hairs prevail on rocky sites in the tablelands but are also found on the coastal plain west of Sydney. Leaves with short, stiff, spreading hairs are found in the southwest. However, over an extensive area in Victoria and South Australia all types of indumentum are found without very clear geographic separation. Some of the Victorian and South Australian specimens with a dense indumentum of short hairs suggest intergradation with *P. varia.* Three ploidy levels have been found within *P. gaudichaudii* but only tetraploids are known in *P. varia* on the mainland. The apparently extensive intergradation between these species in some regions is in contrast to the clear distinction shown at other sites where they both occur. The extent of hybridization may well depend on whether distributional overlap is between forms of the same ploidy level.

The combination of narrow leaves and conspicuous basal axillary hairs is distinctive.

18. Plantago turrifera *Briggs, Carolin et Pulley* in Contr. New South Wales Natl. Herb. 4: 396 (1973).—TYPE: 10 miles (16 km) NE. of Byrock, N.S.W., *J. Thompson NSW 124895,* 8.9.1969 (NSW HOLOTYPE, upper left specimen on sheet).

Annual with a slender persistent taproot and numerous thin secondary roots. *Leaves* all basal, arranged in a rosette, ascending or spreading, narrow-elliptic, 4–10 cm long, 8–25 mm wide, pubescent on both surfaces, ± obtusely toothed on the margin and sometimes with a tuft of long hairs on the anterior margins of the teeth, 3–5-veined, narrowing into a densely pubescent indistinct petiole which broadens at the base and covers the axillary tuft of whitish-yellow hairs. *Scapes* to 30 cm long, longer than the leaves, pubescent with white antrorse-appressed hairs. *Spikes* somewhat loose, (0.5–) 5–10 cm long, usually straw-coloured and not glossy. *Bracts* elliptic to ovate, 1.5–2 mm long, c. 1 mm wide, ciliate with a glabrous or slightly pubescent, obtuse carina c. ⅓ of the total width. *Sepals* subequal; elliptic, 1.8–2 mm long, 1–1.5 mm wide, the anterior sepals obtuse but the posterior ones acute, all with a glabrous or slightly pubescent carina ¼–⅓ of the total width. *Corolla*: tube 1.5–2 mm long; lobes ovate to orbicular, 0.6–1.8 mm long, 0.6–1 mm wide, acute with an indistinct midvein. *Stamens* with filaments 3–4 mm long; anthers 0.6–1 mm long, 0.4–0.6 mm wide. *Style* 3.5 mm long. *Ovary* bilocular, one loculus with 2 ovules and the other with 3, the apical ovule separated in a false loculus by a swelling of the placenta. *Capsule* ovoid, 3.0–3.4 mm long, 1.7–2.0 mm diam., with a cylindrical beak, truncated and usually 4-lobed at the apex, the hardened upper portion 2–2.5 mm long, the lower portion 1–1.2 mm long. *Seeds* to 5 in number, reddish-brown to golden-brown, with a superficial hilum; lower 4 seeds biconvex, elliptic, 1.2–1.8 mm long, 0.8–1.2 mm wide; apical seed smaller, irregular and contained in the beak. *Chromosome number*: $2n = 12$. Fl.: mostly July-Nov.

Distribution: Central Western Slopes, Western Plains and Far Western Plains; occasionally introduced on the Central Coast and Central Tablelands. In temporarily moist open sites in grassland, woodland and on saltbush plains; on clayey, sandy or stony soils. Also known from southwestern Queensland, northwestern Victoria, eastern South Australia and inland Western Australia.

Central Coast: Flemington Saleyards, Sydney, *Reyenga* 8.1969 (CANB). Central Tablelands: Blue Mountains, *Betche NSW 63328*, 10.1887 [probably introduced on the Coast and Tablelands by travelling stock]. Central Western Slopes: Coulsons Creek, foot of Liverpool Range, N. of Merriwa, *Briggs 220*, 9.1968; Strahorn State Forest, Mungery (NW. of Peak Hill), *Constable NSW 17562*, 10.1951; 13 miles [c. 21 km] from West Wyalong towards Hay, *Phillips* 9.1965 (CBG); Thuddungra (NW. of Young), *Autry-Hall NSW 63464*, 9.1950; Temora, *Dwyer NSW 63482*, 10.1915. Western Plains: "Iolanthe", 16 miles [26 km] W. of Garah, *Solling 558a*, 10.1973; Enngonia, *Carolin 676*, 8.1958 (SYD); Narran R, N. of of Narran Lake, *Thompson 2108*, 9.1974; Lightning Ridge, "3-mile Camp", *Salasoo 3813*, 8.1970; Pallamallawa, Gwydir, *Hickey* 8.1884 (MEL); 33 miles [c. 53 km] S. of Enngonia on Bourke-Enngonia road. *Moore 3851*. 7.1966 (CANB); Mt Druid, c. 25 km W. of Brewarrina, *Thompson 1142*, 8.1971; Bendemeer Mtn, 13 km S. of Brewarrina, *Thompson 1636*, 8.1972; Warrego River, 39 miles [63 km] by road W. of Bourke, *Constable 4572*, 10.1963; 11 miles [c. 18 km] from Bourke towards Cobar, *Dunlop 1109 pp.*, 8.1969 (CBG); Carinda district, *Dunlop 821*, 8.1969 (CBG); 29 miles [c. 47 km] N. of Helmans Tank between Cobar and Bourke, *Moore 4340*, 9.1966 (CANB); 21 km on Tilpa road N. from the Cobar-Wilcannia road, *Cunningham 978 & Milthorpe* 8.1973; 10 miles [16 km] NE. of Byrock, *Thompson NSW 124895*, 9.1969; Coolabah, *Peacock NSW 63313*, 9.1898; 18 miles [29 km] NW. of Nyngan, *Thompson NSW 124896*, 8.1969; "Curraweena" N. of Cobar, *D'Arnay & Wells 660*, 9.1968 (CANB); "Cubba", Cobar district, *Dumbleton NSW 99866*, 9.1967; "Buckambool" S. of Cobar, *D'Arnay & Wells 631*, 8.1968 (CANB); Nyngan, *Breakwell* 8.1915 (SYD); "Lucerne Valley", Nyngan, *Cunningham NSW 124377*, 8.1968; 10 km N. of Condobolin on Melrose road, *Cunningham & Milthorpe 3298*, 10.1974; Condobolin, *Brownlee & Markham NSW* 112520, 11.1968; 6 km E. of Condobolin on Parkes road, *Cunningham 787 & Milthorpe* 8.1973; 48 km E. of Lake Cargelligo, *Cunningham 1399 & Milthorpe* 8.1973; 12 miles [c. 19 km] from Lake Cargellico towards West Wyalong, *Phillips CBG 027950*, 9.1966 (CBG); "Waabalong", Hillston, *Cunningham 1293 & Milthorpe* 8.1973; Hill Plain, 10 miles [16 km] S. of Deniliquin, *Whaite NSW 63316*, 9.1953. Far Western Plains: Paroo River, Wanaaring, *Johnson 547/146*, 6.1947; 20 miles [32 km] E. of Wanaaring, *Cunningham 502*, 8.1972; "Mt Mulyah", c. 60 miles [100 km] NW. of Louth, *Moore 6439*, 8.1973 (CANB); "Woodlands", c. 10 km N. of Louth, *Moore 6630*, 9.1974 (CANB); "Tarella", *Bäuerlen*, 8.1887 (MEL); 44 miles [c. 70 km] from Pooncarie towards Darnick, *Dunlop 1480*, 8.1969 (CBG); junction of Darling and Murray Rivers, *Holding* 1889 (MEL).

There is no evidence of currently active intergradation of *P. turrifera* with either of the allied species *P. cunninghamii* or *P. drummondii*, although *P. cunninghamii* may have originated from hybridization between the other two species (see also under *P. cunninghamii*).

P. turrifera is distinguished from all other Australian species by the nearly cylindrical, truncate, minutely 4-lobed beak on the capsule (see Fig. 1).

19. Plantago cunninghamii *Decaisne* in Candolle, Prodr. 13 (1): 702 (1852); Pilger in Engler, Pflanzenr. 269, Heft 102: 276 (1937).—TYPE: N.S.W., *A. Cunningham* (P HOLOTYPE, photo NSW).

P. mitchellii Decaisne in Candolle, Prodr. 13 (1): 701 (1852); Pilger in Engler, Pflanzenr. 269, Heft 102: 275 (1937).—TYPE: In Nov. Holl. subtropica, *Mitchell* (P HOLOTYPE). The holotype was originally reported to be in Hooker's herbarium (K) but Pilger reports finding no such specimen at Kew, and this is confirmed by L. Pedley (pers. comm. 1971). *P. mitchellii* is here for the first time synonymized under *P. cunninghamii*; these two names dating from the same original publication.

PROBABLE SYNONYMS: *P. varia* R. Br. var. *parviflora* Benth., Fl. Austral. 5: 141 (1870); *P. debilis* R. Br. var. *parviflora* (Benth.) Pilger in Engler, Pflanzenr. 269, Heft 102: 271 (1937). Bentham cited "N.S. Wales and more frequently in Victoria, also Kangaroo island, R. Brown." No specimens so labelled, collected by Brown, were found at K or BM (pers. comm. L. Johnson). The only possible Type specimen we have seen is a collection of *P. cunninghamii* which was named and labelled (by F. Mueller) as *P. varia* var. *parviflora* and cited by Bentham in the general citation list for this species: Wimmera, *Dallachy,* Mueller 1869 (K). This shows the features noted by Bentham and the description given by Pilger appears to have been based on it. Since Bentham cited only Brown's collections under this name, and listed the Wimmera collection elsewhere, the latter cannot be selected as lectotype.

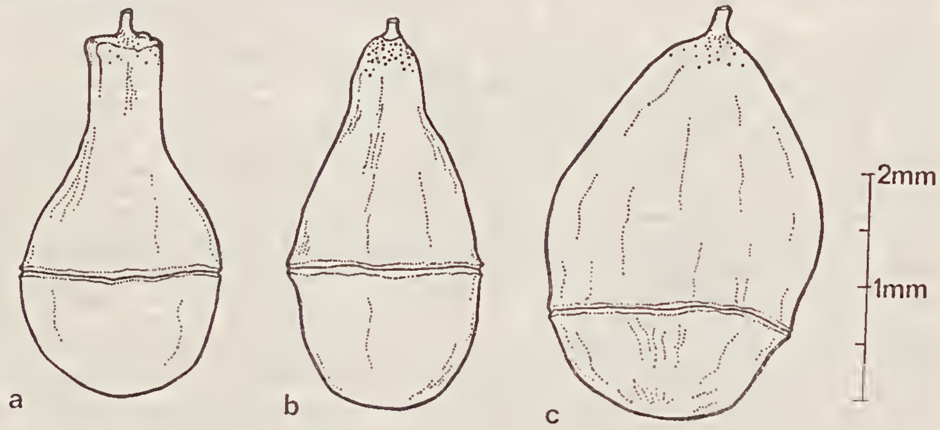

Fig. 1. Capsules of native annual species:

(a) *Plantago turrifera* (NW. of Nyngan, *Thompson NSW 124896*);

(b) *P. cunninghamii* (N. of Quambone, *Thompson NSW 121558*);

(c) *P. drummondii* (N. of Wentworth, *Rodd NSW 121629*).

Annual or short-lived herb with a short caulorrhiza and a persistent taproot with numerous secondary roots. *Leaves* all basal and arranged in a rosette, ascending to erect, oblanceolate to narrow-oblong, 6–10 cm long, 4–15 (–25) mm wide, obtuse, pubescent on both surfaces, dentate but sometimes obscurely so, 3-veined, tapering gradually into an indistinct petiole and a broadened base obscuring the axillary tuft of short white hairs. *Scapes* up to 20 cm tall, pubescent with antrorse-appressed hairs. *Spikes* 2–10 cm long. *Bracts* oblong-elliptic, concave, 1.5–1.8 mm long, 0.7–1 mm wide, with a ± keeled pale to dark-brown but not glossy glabrous or pubescent carina ½–⅔ of the total width. *Sepals* subequal, elliptic, 1.5–2 mm long, 1–1.5 mm wide with a broad carina similar to that of the bracts but more distinctly angled. *Corolla*: tube 1.5–2 mm long; lobes ovate to broad-ovate, 1 mm long, 0.8–1 mm wide, acute-acuminate with a fairly distinct midvein. *Stamens* with filaments up to 3 mm long; anthers 0.4 mm long, 0.5 mm wide. *Style* 3–4 mm long. *Ovary* bilocular, one loculus with 2 ovules the other with 3 of which the uppermost is separated from the lower 2 by a swelling of the placenta. *Capsule* ovoid, (2.8–) 3.0–3.5 mm long, 1.7-2.0 (–2.4) mm diam., the upper hardened portion terminated by a short conical beak, the lower membranous portion 0.5–0.7 mm long. *Seeds* up to 5, with a superficial hilum and a mucilaginous layer; lower seeds pale brown, elliptic, 1 mm long; apical seed angular, darker, smaller, contained in the beak and with a thinner mucilaginous layer. *Chromosome number*: $2n = 12$. Fl.: mostly Aug.-Nov.

Distribution: Western Slopes, Western Plains (particularly in the northern half) and Far Western Plains. Mostly on heavy clay soils in temporarily moist open sites in grassland, woodland and saltbush plains. Also in inland districts of Queensland, northwestern Victoria and the Northern Territory; probably to be expected along river systems in the drier parts of eastern South Australia.

North Western Slopes: Curlewis [S. of Gunnedah], *Breakwell NSW 63442*, 8.1913; Lake Goran, 1 mile [1.5 km] NW. of Howes Hill, E. of Tambar Springs, *Briggs 2246*†, *2250*, 9.1968; near Warrah [W. of Willow Tree], *Gregson NSW 63460*, 10.1897. Central Western Slopes: 12 miles [20 km] W. of Peak Hill, *Swain NSW 136265*, 10.1973; Parkes, *Cheel NSW 63461*, 8.1926. South Western Slopes: Wallandool Reserve, near Urangeline [NW. of Henty], *McBarron 5136*, 10.1950. Western Plains: North Star, *Haley NSW 112493*, 11.1968; Weemelah, NW. of Moree, *McBarron 15766*, 9.1968; "Iolanthe", 16 miles [26 km] W. of Garah, *Solling 558b*, 10.1973, *Wilson 1330*, 10.1975; "Arrara" to "Lake Eliza", *Boorman NSW 63320*, 10.1912; Warrego River, *Betche NSW 63303*, 9.1885; "Bairnkine", Collarenebri, *Gibbin 43*, 4.1928 (SYD); 16 miles [c. 26 km] from Brewarrina towards "Dunsandle" via Collerina and "Bora", *Dunlop 926*, 8.1969 (CBG); Brewarrina district (various localities and dates), *Thompson 38, 568, 1119, 1867, 2200, 2201*, Warrego River, 39 miles [63 km] by road W. of Bourke, *Constable 4572a*, 10.1963; Walgett, *Little NSW 63302*, 10.1899; 5 miles [8 km] ENE. of Bourke on Brewarrina road, *Constable 4477*, 10.1963; "Rossmore", Bourke, *Milthorpe & Cunningham 2834*, 9.1974; Bourke, *Henry 34*, 1884 (MEL); Clover Creek near Bourke, *Mackay 43*, - (MEL); 2 miles [c. 3 km] from Bourke towards Cobar, *Dunlop 1062*, 8.1969 (CBG); 1 km S. of Burren Junction on road to Pilliga, *Briggs 4332*, 6.1971; 6 miles [10 km] SW. of Burren Junction, *Launders NSW 87084*, 9.1968; 9 km W. of Wee Waa, at Gunidgera Creek, on road to Burren Junction, *Briggs 4323*, 6.1971; Narrabri, *Breakwell NSW 63310*, 10.1912; Namoi River, Pilliga, *McBarron 20286*, 9.1971; 5 miles [8 km] W. of Louth, *Moore 5865, 5872*, 9.1971 (CANB); 46 miles [74 km] from Coonamble towards Carinda, *Dunlop 764*, 8.1969 (CBG); 15 miles [24 km] N. of Quambone, *Thompson NSW 121558*, 9.1969; "Wongalea", Coonamble, *Maxwell NSW 136266*, 9.1973; Coonamble, *Breakwell NSW 63314*, 8.1912; 8 km SW. of Hillston on road to Booligal, *Briggs 2849*, 10.1969; Hanwood, Griffith district, *Sainty NSW 136267*, 11.1964; Pimpara Creek, between Maude and Oxley, *Jacobs 1005*, 9.1973; "Torry Plains", 24 miles [39 km] from Maude, *Lander 218*, 10.1972; Leeton, *Green NSW 63309*, 6.1948; Yanco, *Chippendale NSW 63315*, 10.1951; 39 miles [63 km] W. of Hay on Oxley Road, *Jacobs 404*, 10.1972; 50 km from Hay towards Narrandera, *Phillips CBG 038594*, 8.1968; Hay-Balranald road, *Constable NSW 63306*, 10.1947; near Nyngay Creek, 24 miles [39 km] S. of Hay, *Briggs 2827*, 5.1969; "Zara", Wanganella, *Officer NSW 63305*, 10.1915, *NSW 63301*, 10.1917; CSIRO Field Station, Deniliquin, *Noble NSW 136268*, 9.1973. Far Western Plains: Hungerford to Brindingabba (N. of Wanaaring), *Boorman NSW 63322*, 10.1912; Paroo River, Wanaaring, *Johnson 547/146a*, 6.1947; 3 km NE. of Wentworth on road to Tapio, *Briggs 2777*, 5.1969; Wentworth, Darling River, *Minchin* 10.1887 (MEL); 1.5 km SW. of Kyalite, near Wakool River, 40 km S. of Balranald, *Briggs 2799*, 5.1969.

P. cunninghamii was very generally included under *P. varia* by many authors but was regarded as probably synonymous with *P. debilis* by Bentham, Fl. Austral. 5: 139 (1870).

The characteristics of *P. cunninghamii* are more or less intermediate between those of *P. turrifera* and *P. drummondii.* Two possible explanations of this are (a) that *P. cunninghamii* is derived from early or repeated hybridization between *P. turrifera* and *P. drummondii* or (b) that it represents an ancestral group from which differentiation has produced the other two species. The following information is relevant but does not conclusively decide between these possibilities: (i) *P. cunninghamii* occurs over a considerable area of the Western Slopes and the northeast of the Western Plains where *P. drummondii* is not recorded. Over a great deal of this area it is much more common than *P. turrifera*; (ii) it is not known to occur in Western Australia despite the presence there of both the other species; (iii) *P. turrifera* and *P. drummondii* have been collected in the same general location at Overland Corner, S.A., and Dara without *P. cunninghamii* being recorded, while in other districts (e.g. Bourke, N.S.W., Wyperfeld National Park, Vic., and the Bulloo R area, Qld.) all three groups are present.

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† Unusually variable population; perhaps some intergradation with *P. turrifera* but that species not reported from the North Western Slopes.

P. cunninghamii is distinguished among the annual species by the conical beak of the capsule (see Fig. 1). Some specimens of *P. drummondii* from South Australia and Western Australia also have a somewhat conical beak but the capsule is larger.

20. P. drummondii *Decaisne* in Candolle, Prodr. 13 (1): 701 (1852); Pilger in Engler, Pflanzenr. 269, Heft 102: 262 (1937).—Possible Isotype: Swan River [Western Australia], *Drummond*; this has been examined and compared with *Morris NSW 121557* by L. Pedley. The holotype was cited as Swan River, *Drummond 71* but no collector's number appears on the label of the sheet in K.

Plantago pritzelii Pilger in Repert. Spec. Nov. Regni Veg. 20: 12 (1924): Pilger in Engler, Pflanzenr. 269, Heft 102: 262 (1937); Willis, Handb. Pl. Victoria 2: 606 (1973).—Type: Government North West Expedition [S.A.], *H. Basedow 385*, 1903 (NSW 47495 Isotype).

Annual or short-lived herb with a short caulorrhiza and a persistent taproot. *Leaves* all basal, arranged in a rosette, ascending or erect, thick, narrow-elliptic to oblanceolate or narrow-oblong, (1–) 6–14 (–18) cm long, (0.2–) 0.3–1 (–2.4) cm wide, villous-pubescent (often densely so) on both surfaces, dentate but sometimes obscurely so, 3-nerved, tapering very gradually towards the broadened and slightly scarious base which obscures the tuft of short, white, axillary hairs. *Scapes* up to 30 cm long, villous-pubescent. *Spikes* (1–) 2.3–12 (–19) cm long. *Bracts* ovate, concave, glossy, brown to black, 1.5–4 mm long, 1.5–2 mm wide; with a broad, glabrous or sparsely pubescent carina, ± glossy and thickened over the total width except for a narrow ciliate margin. *Sepals* subequal, elliptic to obovate, concave, 1.8–3.5 mm long, 1–2 mm wide, obtuse; with a rounded glabrous or sparsely pubescent, glossy, dark-brown to black carina, c. ⅔ of the total width. *Corolla*: tube 2–3 mm long; lobes ovate (1–) 1.4–2.5 mm long, 1–1.8 mm wide, acute with a relatively obscure midvein. *Stamens* with filaments up to 3 mm long; anthers 1.5 mm long, 1 mm wide. *Style* 5–7 mm long. *Ovary* bilocular, one loculus with 2 ovules and the other with 3, the apical ovule separated in a false loculus by a swelling of the placenta. *Capsule* ovoid to sub-globular with broadly acute apex, (3.0–) 3.3–5.0 mm long, 2.2–3.2 mm diam., the hardened upper section usually glossy and dark-brown to black, the lower membranous persistent section c. 2 mm long. *Seeds* up to 5 in number with a thick mucilaginous layer and a superficial hilum, the lower seeds falling almost immediately the capsule dehisces but the apical seed contained in the beak and shed very tardily from the cap of the capsule; lower seeds elliptic, 2–2.7 mm long, 1–1.4 mm wide, golden-brown to dark-brown; apical seed irregular, somewhat smaller and with a thinner mucilaginous layer. *Chromosome number*: $2n = 12$. Fl.: mostly May-Oct. "Sago-weed" (name also applied to *P. cunninghamii*).

DISTRIBUTION: Western Plains and Far Western Plains. In temporarily moist sites on heavy soils, in grassland, shrublands and saltbush plains. Also in Queensland, northwestern Victoria, South Australia, Western Australia and the south of the Northern Territory.

WESTERN PLAINS: Clover Creek near Bourke, *Mackay* 1890 (MEL); 11 miles [c. 18 km] from Bourke towards Cobar, *Dunlop 1109 p.p.*, 8.1969 (CBG); 19 km S. of Bourke on Cobar Road, *Jacobs 43*, 11.1971; Donalds Plain, 75 miles [120 km] W. of Cobar, *Constable 4651*, 10.1963; Mossgiel, *Brückner* 1885 (MEL); 8 km SW. of Hillston on road to Booligal, *Briggs 2848*, 10.1969; Lachlan R. *Cunningham 51*, 1817 (K), *Bell* 10.1887 (MEL); 24 km S. of Booligal on road to Hay, *Briggs 2851*, 10.1969; Lake Wyangun, near Griffith, *Sainty NSW 121628*, 10.1966; 40 km from Hay towards Gunbar, *Phillips 127a*, 9.1965; Hay district, *Officer NSW 63317*, 9.1903. FAR WESTERN PLAINS: Tibooburra, *Constable NSW 10776*, 10.1949; Milparinka, *Beadle* 9.1939 (SYD); 6.3 miles [10 km] NE. of "Mt Shannon" homestead on Milparinka road (16 km SSW. of Milparinka) *Lee 242*, 9.1971; 3.5 miles [5.6 km] ENE. of "South Yandaminta", 44 km SW. of Milparinka *Lee 239*, 9.1971; W. bank of the Salt Lake [45 km SSE. of Milparinka], *Lee 253*, 9.1971; c. 1.6 km S. Cobham Lake, 50 km SSE. of Milparinka, *De Nardi 825*, 9.1971; Paldrumatta Bore (c. 52 km SE. of Milparinka), *Corbett NSW 63318*, 11.1901; "Nantilla" [60 km SW. of Wanaaring], *Richley 1057*, 8.1973; "Mt Mulyah", c. 80 km NW. of Louth, *Moore 7061*, 10.1975 (CANB); along NSW/SA border fence, c. 30 km N. of Brougham Gate, *Lee 232*, 9.1971; Lake Baneannia (c. 115 km W. of White Cliffs), *Carolin 4311*, 8.1964 (SYD); Evelyn Creek N. of Barrier Range, *King* 1887 (MEL); 5 km SE. of "Tielta" homestead, 116 km NNW. of Broken Hill, *De Nardi 721*, 9.1971; 39 miles [63 km] from Packsaddle towards Broken Hill, *Dunlop 1339*, 8.1969 (CBG); 2 km N. of Fowlers Gap on Tibooburra road, *Cunningham 1358 & Milthorpe* 8.1973; Fowlers Gap, *Jacobs 2209*, 10.1975; 3–6 km NE. of "McDougalls Well" homestead, 95 km NNW. of Broken Hill, *De Nardi 752, 764*, 9.1971, *Lee 209*, 9.1971; road from Mootwingee Historic Site to "Gnalta" (c. 110 km NE. of Broken Hill), *Lee 267*, 9.1971; Mootwingee Historic Site, *Lee 269*, 9.1971; South Australian border, 60 miles [96 km] N. of Cockburn, *O'Connell NSW 63327*, 1.1936; c. 5 miles N. of "Lintiss Vale" between Yanco Glen and Mootwingee, *Briggs 2766*, 5.1969; 3 km. N. of Wilcannia on White Cliffs road, *Cunningham & Milthorpe 2942*, 10.1972; Wilcannia, *Kennedy* 1885, 1888 (MEL); 66 miles [c. 105 km] from Wilcannia towards Cobar, *Dunlop 1237*, 8.1969 (CBG); 128 km W. of Cobar on Barrier Highway, *Cunningham 1018 & Milthorpe* 9.1973; 37 km ENE. of Broken Hill on Barrier Highway, *Briggs 2739*, 5.1969; "Bilpa", 15 km SE. of Little Topar Hotel, *De Nardi 703*, 9.1971; Broken Hill and Tarrowangee, *Deane NSW 63323*, 8.1893; Broken Hill, *Andrews NSW 63324*, 9.1918, *Cheel NSW 63326*, 8.1926; 1 mile [1.5 km] N. of Quandong Hotel, Broken Hill-Menindee road [c. 48 km ESE. of Broken Hill], *Constable NSW 38465*, 7.1955; "Appin", Menindee, *Milthorpe & Cunningham 2643*, 8.1974; Menindee, *Ford NSW 63325*, 9.1946; between Darling and Lachlan Rivers, *Brückner* 8.1885 (MEL); 1 km W. of The Walls of China, E. of "Mungo", *Briggs 2789*, 5.1969; 26 miles [42 km] N. of Wentworth on road to Broken Hill, *Rodd NSW 121629*, 8.1969; Wentworth, *Vickery NSW 63319*, 10.1949; junction of Darling and Murray Rivers, *Minchin* 10.1887 (MEL); Balranald, N. side of town, *Briggs 2789*, 5.1969; 1.5 km SW. of Kyalite, near Wakool River, 25 miles [40 km] S. of Balranald, *Briggs 2800*, 5.1969.

Some collections are difficult to place in respect to *P. cunninghamii* and *P. drummondii*, particularly if mature capsules are lacking. There is no definite evidence of currently active hybridization with either of the allied species *P. cunninghamii* and *P. turrifera*. However, hybrids with the former would be difficult to distinguish and hybrids with the latter would resemble *P. cunninghamii*.

The combination of annual habit, acute capsules without a prominent beak, and large capsule size is distinctive among Australian species (see Fig. 1). Bracts, sepals and capsules are generally dark and glossy in *P. drummondii*; pale, non-glossy plants occur in parts of South Australia and Western Australia but very rarely elsewhere.

90	Capparidaceae
91	Resedaceae
92	Droseraceae
93	Crassulaceae
94	Escalloniaceae
95	Pittosporaceae
96	Cunoniaceae
97	Davidsoniaceae
98	Rosaceae
99	Mimosaceae
100	Caesalpiniaceae
101	*Papilionaceae, Part 1*
102	*Geraniaceae*
103	Oxalidaceae
104	Linaceae
105	Erythroxylaceae
106	Zygophyllaceae
107	Rutaceae
108	Simaroubaceae
109	Burseraceae
110	Meliaceae
111	Tremandraceae
112	Polygalaceae
113	Euphorbiaceae
114	Callitrichaceae
115	Anacardiaceae
116	Aquifoliaceae
117	Celastraceae
118	Siphonodontaceae
119	Hippocrateaceae
120	Stackhousiaceae
121	Icacinaceae
122	Sapindaceae
123	Akaniaceae
124	Rhamnaceae
125	Vitaceae
126	Elaeocarpaceae
127	Tiliaceae
128	Malvaceae
129	Sterculiaceae
130	Dilleniaceae
131	Eucryphiaceae
132	Hypericaceae
133	Elatinaceae
134	Frankeniaceae
135	Violaceae
136	*Flacourtiaceae, with Supplement*
137	Passifloraceae
138	Cactaceae
139	Thymelaeaceae
140	Lythraceae
141	Rhizophoraceae
142	Myrtaceae
143	Melastomataceae
144	Onagraceae
145	Haloragiaceae
146	Araliaceae
147	Umbelliferae
148	Alangiaceae
149	Ericaceae
150	Epacridaceae
151	Myrsinaceae
152	Primulaceae
153	Plumbaginaceae
154	Sapotaceae
155	Ebenaceae
156	Symplocaceae
157	Oleaceae
158	Loganiaceae
159	Gentianaceae
160	Menyanthaceae
161	Apocynaceae
162	Asclepiadaceae
163	Convolvulaceae
164	Polemoniaceae
165	Hydrophyllaceae
166	Boraginaceae
167	Verbenaceae
168	Avicenniaceae
169	Labiatae
170	Solanaceae
171	Scrophulariaceae
172	Selaginaceae
173	Bignoniaceae
174	Pedaliaceae
175	Martyniaceae
176	Orobanchaceae
177	Gesneriaceae
178	Lentibulariaceae
179	Acanthaceae
180	Myoporaceae
181	*Plantaginaceae*
182	Rubiaceae
183	Caprifoliaceae
184	Dipsacaceae
185	Cucurbitaceae
186	Campanulaceae
187	Lobeliaceae
188	Goodeniaceae
189	Brunoniaceae
190	Stylidiaceae
191	Compositae

PTERIDOPHYTA

192	Lycopodiaceae
193	Selaginellaceae
194	Isoetaceae
195	Psilotaceae
196	Ophioglossaceae
197	Marattiaceae
198	Osmundaceae
199	Schizaeaceae
200	Gleicheniaceae
201	*Hymenophyllaceae*
202	Cyatheaceae
203	Dennstaedtiaceae
204	Lindsaeaceae
205	Pteridaceae
206	Adiantaceae
207	Vittariaceae
208	*Davalliaceae*
209	*Grammitidaceae*
210	*Polypodiaceae*
211	*Aspidiaceae*
212	Athyriaceae
213	Thelypteridaceae
214	Aspleniaceae
215	Blechnaceae
216	Marsileaceae
217	Azollaceae
218	Salviniaceae